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UNIVERSITY OF ALBERTA

PREPARATORY EDUCATION REQUIREMENTS FOR DENTAL HYGIENISTS

BY

LOUANNE P. KEENAN ©

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Education in

ADULT AND HIGHER EDUCATION

Department of Adult, Career and Technology Education
Edmonton, Alberta
Fall, 1995

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled PREPARATORY EDUCATION REQUIREMENTS FOR DENTAL HYGIENISTS submitted by LOUANNE PATRICIA KEENAN in partial fulfillment of the requirements for the degree of MASTER OF EDUCATION in ADULT AND HIGHER EDUCATION.

D. Collett, Supervisor

AK Deane
A. K. Deane

S. Compton

Date: Sept 5/95

DEDICATION

I dedicate this thesis to my husband Jeremy, and my sons, Andrew and Daniel. Their faith in my abilities, assistance in computer skills and understanding of the time commitment required, provided the loving environment essential for success. I thank God for surrounding me with the strength of my friends and family: George and Louise; Allen, Maureen, Barry, Kathleen, Mark, Leslie, and Glen.

ABSTRACT

This study was designed to identify competencies required for a graduating dental hygienist to be qualified to provide oral hygiene care. An additional aim of the study was to determine if selected demographic factors affect the dental hygienists' responses.

The data were gathered through questionnaires which were sent to a stratified random sample of 240 Western Canadian dental hygienists, 80 respondents from each province: British Columbia, Alberta, and Saskatchewan. The statistical procedures used to analyze the quantitative data included means and standard deviations of responses, cross-tabulations, and an analysis of variance. The qualitative component consisted of comments on the questionnaires which were transcribed and analyzed.

The competencies were organized into five areas of responsibility: clinical therapy, health promotion, education, administration and research. The education category was rated the highest in importance by the respondents. Following education in the ranking of importance were the clinical therapy subcategories that related to the implementation of treatment, safety and preparation of the clinical environment and obtaining client information. Administration and research were the next categories in the ranking of importance. The clinical therapy subcategories which were rated the lowest in importance according to the respondents were the periodontal, restorative and orthodontic procedures and specialty procedures such as oral diagnostic tests, dental photographs, and procedures which are also performed by dental assistants.

The diversity in practice configurations and multi-faceted role responsibilities provide a challenge to the identification of competencies which reflect preparatory skills. An analysis of the demographic factors revealed that respondents from Saskatchewan rated all of the categories higher in importance than respondents from Alberta and British Columbia. The year of graduation had a direct relationship to the rating of importance of the practice of infection control (the higher the year, the higher the rating). The dental hygienists who worked in a post-secondary education setting had higher ratings of importance for all the competencies except peridontics and research. Community health practitioners had comparable or higher ratings in these two categories. Analysis of the respondents' educational qualifications demonstrated that the respondents with only a diploma in dental hygiene rated all of the competencies lower than respondents with additional education.

The outcomes of this study will contribute to initiatives in curriculum development, accreditation, national certification and quality assurance. Standardized documentation of dental hygienists' roles will provide other health care professionals and the general public with an understanding of the dental hygiene profession. Further research in the areas of consumer needs, cost-effectiveness and improvement of access to care and information is required.

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CHAPTER 1

INTRODUCTION

Dental hygienists are licensed primary oral health care professionals whose role involves five primary responsibilities: clinical therapy, education, health promotion, administration and research (Paarmann, Herzog, & Christie, 1990). The profession of dental hygiene has grown and developed since the initiation of a six month program in 1913, by Dr. Fones of Bridgeport, Connecticut; the first school in Canada was a two year program at the University of Toronto in 1951; in 1995 there are fifteen two-year dental hygiene diploma programs in Canada, and two four-year baccalaureate degree programs.

At this time, Canadian dental hygienists are given the right to the title and to practice dental hygiene according to the regulations in the province in which they are registered. The licensing jurisdiction sets the requirements for licensure and the scope of practice, as well as setting an annual license fee. Gallagher and Forgay (1994) commented on how requirements vary across the provinces: "restorative skills, administration of local anesthetic, and orthodontic procedures are allowed or required in some provinces but not in others" (p. 177). National certification would standardize the requirements for licensure which would give dental hygienists greater portability within the country.

Four provincial governments have recognized dental hygiene as a self-regulated profession: British Columbia, Alberta, Ontario and Quebec. The Act enables the dental hygiene association in the province to establish registration requirements, scope of practice, mandatory continuing education, continued competency, and complaint and disciplinary procedures for the profession of dental hygiene (Walker, B., Juchli, J., & Pimlott, J., 1993; Strivens, 1993). Dental hygienists in the remaining provinces are governed by the College of Dental Surgeons in their province.

Strivens (1993) outlined the benefits of a governing body establishing entry level requirements in a scope of practice document:

> The statement outlines for consumers, members of the profession, employers and courts, the proper range of the profession's scope of practice and for the educators the statement may be used to guide them with curricula design and update. The new scope-of-practice model will provide equal standing to a larger number of regulated health professions, as there will be more opportunities for different professions to work together. (p. 98).

It is in the interest of the profession and the public to have practice standards defined.

The Canadian Dental Hygienists' Association (CDHA) recognized that the profession of dental hygiene is affected by numerous factors: self-regulation, the expansion of new knowledge and the changing needs of the health care consumer. There are risks associated with infectious diseases (Miller & Palenik, 1994), increased needs of society for quality oral care (Dickoff, 1988; Ray, 1992) and a projected increase in demand for dental hygiene (Johnson, 1992; Dickoff 1988). Therefore, the CDHA initiated the development of a practice standards document which identifies preparatory skills which should be included in educational programs in dental hygiene.

Since 1984 the Board of Directors of the Canadian Dental Hygienists' Association (CDHA) has been involved in defining the scope of practice of Canadian dental hygienists (Brownstone, 1984). In 1988, the federal government sponsored a "Working Group on the Practice of Dental Hygiene" to publish the clinical practice standards for Canadian Dental Hygienists (Clinical Practice Standards for Dental Hygienists in Canada, 1988). The Working Group required the assistance of an Advisory Committee in developing the report. The objective of the document was to ensure high standards of patient care. However, the focus was on the clinical components of dental hygiene practice; the CDHA recognized the need to expand the document to include the other responsibilities of the dental hygienist. Further discussions between the Federal Government, Provincial Governments and the two Territories regarding Internal Trade Human Resources Agreements indicate that national educational standards will have to be set and provinces will be obligated to meet those standards.

The practice standards document, Dental Hygiene: Definition and Scope (1994), was developed in response to the identified need, through a series of workshops, and is presently under final review: "Last October in Winnipeg, 29 people invested their time, expertise, intellectual energy and creativity while participating in a workshop which resulted in the first draft of revised Education Standards for Canadian dental hygienists" (Canadian Dental Hygienists Association Journal, 1995, p. 10). The Education Standards document is one part of the Practice Standards Document. Education standards define the common body of knowledge and skills for the dental hygiene profession. These standards reflect the entry to practice level of competency expected of dental hygienists in Canada. The document will be utilized for accreditation of dental hygiene programs, certification of dental hygienists, legal issues and consumer information.

When other disciplines can access the dental hygienists' scope of practice they will be able to draw on their expertise for interdisciplinary research.

Walker et al. (1993) stated that government involvement increased dramatically in Alberta when the ADHA attained self-regulation:

> The ADHA has been included in numerous government surveys, task forces, and working groups dealing with the creation of health policies for the province. This relationship between government and dental hygiene was non-existent prior to self-regulation. (p. 61).

A national standard for scope of practice will provide a strong network for lobbying and acquiring needed resources which will enhance organizational development. (Johnson, 1990).

The diversity in practice configurations and multi-faceted role responsibilities provide a challenge to the development of practice standards which reflect preparatory skills (Kraemer & Gurenlian, 1989). This study identifies competencies required for a graduating dental hygienist to be qualified to provide oral hygiene care. The outcomes of this study will contribute to initiatives in curriculum development, accreditation, national certification and quality assurance.

Problem Statement

The purpose of this study was to identify competencies required for a graduating dental hygienist to be qualified to provide oral hygiene care.

Research Questions

In order to meet its intended purpose, the study sought answers to the following research questions:

1. Which clinical therapy competencies identified in the survey should be included in a dental hygiene preparatory education program?
2. Which health promotion competencies identified in the survey should be included in a dental hygiene preparatory education program?
3. Which education competencies identified in the survey should be included in a dental hygiene preparatory education program?
4. Which administration competencies identified in the survey should be included in a dental hygiene preparatory education program?
5. Which research competencies identified in the survey should be included in a dental hygiene preparatory education program?
6. Which preparatory level competencies occur in practice but are not identified in the survey?
7. How do selected demographic factors affect the dental hygienists' responses in each of the five categories of responsibility?

Significance of the Study

The results of the study provide insight into some of the differences in expectations of dental hygienists and indicate some of the areas that need further research concerning the competencies required for preparatory level dental hygienists (Strivens, 1993). If the trend towards self-regulation and independent practice continues (Walker et al., 1993; Differding & Boyer, 1994)), it will become essential for the CDHA to standardize the preparatory education programs in order to implement certification to individuals and accreditation to the institutions from which the dental hygienists are graduating (Rigolizzo-

Gurenlian & Gluch-Scranton, 1986). This will no longer be the responsibility of the College of Dental Surgeons.

Dental hygienists develop a collaborative relationship with their clients, with other health care professionals, and with the general population in an effort to achieve and maintain oral health as an integral part of well-being (Dickoff, 1988). Standardized documentation of dental hygienists' roles will provide other health care professionals and legal professionals with an understanding of the dental hygiene profession (Darby, 1983).

Increased consumer awareness could have implications for practice of dental hygienists in the future (Ray, 1992). New technologies such as antibiotic therapy (Page, 1994), lasers (Crawford, 1992), implants (Lockhead, 1993), bleaching, and alternative anesthetic techniques become public knowledge and the clients request information and access to these technologies. The practice standards document will have to evolve alongside of the technological, physiological, biological, and psychological advances in the global community.

Definition of Terms

The dental hygiene practitioner develops and implements health promotion, prevention and therapeutic interventions in a variety of settings.

The professional role of a dental hygienist includes five primary responsibilities, as defined in the document Dental Hygiene: Definition and Scope (1994).

1. Clinical therapy refers to primary interceptive, therapeutic and maintenance procedures which enable the client to achieve optimal oral health and contribute to overall health;

> 2. Health promotion refers to the process of enabling individuals and communities to increase control over and improve their health;
>
> 3. Education refers to teaching/learning; motivational and behavior modification processes which may occur in any dental hygiene practice setting;
>
> 4. Administration refers to policy development and management processes which may occur in any dental hygiene practice setting; and
>
> 5. Research refers to informal and formal scientific investigation, study and reporting which supplements, revises and validates dental hygiene practice. (p. 2)

The document, Education Standards for Entry to the Practice of Dental Hygiene in Canada (1994), provides the following definitions:

> Competence refers to skills, understanding (knowledge), and professional values of an entry-level dental hygiene practitioner.
>
> Competencies refers to statements of skills and abilities that describe the competent provision of dental hygiene services for a client.

Assumptions

Underlying this research are the following assumptions:

1. Specific knowledge, skills and attitudes are inherent in the profession of dental hygiene.
2. Dental hygienists are able to perceive the definition and scope of their profession.
3. The respondents will answer the assessment questions honestly and as accurately as possible.

Delimitations and Limitations

This study was delimited to data collection from a random sample of registered dental hygienists in Western Canada.

The results obtained in examining a random sample of dental hygienists practicing in Western Canada may not be applicable to all Canadian dental hygienists.

Data were collected through the use of a questionnaire designed by the researcher. The inherent limitations of questionnaires were recognized such as the possible misinterpretation of questionnaire items and the limited depth of information obtained.

Outline of the Thesis

Chapter I of this thesis provided the introduction, statement of purpose for the study, research questions, significance of the study, assumptions, definitions, delimitations and limitations. Chapter II is comprised of a review of the literature and focuses on the theoretical background of the five primary responsibilities of dental hygienists, as well as prior research in the area of the development of a practice standards document. The research methodology and instrumentation are described in Chapter III. Chapter IV describes the results from the data analysis. The summary, conclusions, and recommendations for further research are presented in Chapter V, followed by the reference list and the appendices.

CHAPTER 2

REVIEW OF THE LITERATURE

This chapter presents a review of the literature related to the responsibilities which should be included in Canadian dental hygiene preparatory education programs. Discussion will focus on three areas: an introduction to the rationale for developing the Canadian Dental Hygienists' Association practice standards document; explanation of the five primary responsibilities of a dental hygienist, with a summary of the standards related to each responsibility as stated in the Dental Hygiene: Definition and Scope (1994) document; and identification of the demographic factors which may affect the dental hygienists' responsibilities.

Introduction

The Canadian Dental Hygienists' Association's clinical practice standards document was initiated by Health and Welfare Canada in 1983; the final report was published in March, 1988. In June 1991, the Canadian Dental Association identified the need for a current definition of national dental hygiene education standards (Canadian Dental Hygiene Association, 1993a); "The CDHA definition of national education standards was launched in January 1993 with the establishment of a task force" (p. 162). In addition to the clinical care responsibilities defined in the Clinical Practice Standards Document (1988), the following four primary responsibilities were identified by representatives at the workshop: "health promotion, education, administration and research" (Canadian Dental Hygienists' Association, 1993b, p. 163). The responsibilities are similar to the six defined by the American Dental Hygienists' Association: administrator/manager, change agent, health promoter/educator, clinician, consumer advocate, and researcher. (American Dental Hygienists' Association, 1984).

The potential users of a practice standards document would be the same as Chambers' and Gerrow's (1994) list of competency manual users: "schools, departments, course and clinic directors, dental associations, licensing authorities, accrediting organizations, specialty groups and parent disciplines, and examining boards" (p. 362). Chambers and Gerrow describe competency as "the skills, understanding, and professional values of an individual ready for beginning independent dental or allied oral health care practice" (p. 361). The practice standards document represents the entry to practice level of dental hygienists with a diploma in dental hygiene (Canadian Dental Hygienists' Association, 1994).

The definition of practice standards will clarify the responsibilities of dental hygienists. Rigolizzo-Gurenlian and Gluch-Scranton (1986) documented that "If clear delineations in role expectations and responsibilities were identified, role ambiguity and stress would be significantly reduced" (p. 460). Roles and responsibilities of dental hygienists must be defined so that they can have a sense of ownership of their profession.

Darby (1983) believes that the public is "holding the dental hygienist accountable for a defined scope of practice. Dental hygienists have been held legally accountable for judgments exercised and actions taken in the course of dental hygiene practice" (p. 589). Therefore, dental hygienists are experiencing the legal accountability without being given legally responsibility for their own independent practice. A definition of the scope of practice may be the catalyst necessary to move towards independent practice as in California, Washington, and Colorado (California Health Manpower Pilot Project, 1993).

Darby (1983) stated that "Dental hygienists are likely to be dentistry's most cost-effective resource and an important strategy for marketing dental care to segments of the community that have not regularly sought care" (p. 511). The Dental Hygiene: Definition and Scope (1994) document will make it clear to the misinformed dentists and public the extent of dental hygienists' skills. Darby (1983) felt that "We need to acknowledge that dental hygienists receive significantly more education and experience in preventive care than do dental students...It seems ironic that the dental student, after graduation, is required to supervise dental hygienists in some of these areas" (p. 592). Darby (1983) is frustrated by the fact that "Too often, supervision requirements are based on a legal litany of permitted services or physical proximity, rather than on competence and educational qualifications within a defined scope of practice" (p. 593). Darby believes that the public should have access to unsupervised professional dental hygienists. An increase in access to care by dental hygienists will require a clarification of their responsibilities.

Clinical Therapy

Dr. Alfred C. Fones of Bridgeport, Connecticut, is considered to be the founder of dental hygiene; he focused on the shift from the treatment of disease to the maintenance of health (Motley, 1983). Fones began by training his cousin, Irene Newman, to perform the procedures, and then, according to Differding and Boyer (1994), he advocated the training of dental hygienists by state teacher-training institutions: "27 women graduated from a six-month program of lectures on anatomy, histology, physiology bacteriology, sterilization, nutrition, oral structures, psychology, and dental prophylaxis" (p. 221). McPhail stated that by 1961 the services of a dental hygienist included "providing examinations, x-ray service, scaling and cleaning teeth, polishing fillings, providing topical fluoride service and assisting with and providing many other office and laboratory procedures for which they have been trained during the course of formal training" (p. 6). The scope of practice has developed to include pit and fissure sealants, restorations and anesthetics in some provinces (Johnson, 1992; Cessford & Kravtsov, 1994).

Kraemer and Gurenlian (1989), defined the clinical therapy responsibilities (which are comprised of the interceptive, therapeutic and maintenance procedures) in their program-planning model:

> Medical and oral histories, including a periodic review of systems; examination of the hard and soft tissues of the head and neck; examination of the gingiva; evaluation of the occlusion and oral habits; dental and periodontal charting, including notations related to bleeding, exudate, plaque, calculus, stain, mobility, bone level, pocket depths, furcation involvement, gingival margin, width of attached gingiva, mucogingival involvement, and recession; radiographs; intra-oral photographs; study models; and dietary counseling...Periodic assessments are also made during the maintenance therapy phase. (p. 233)

Following the assessment, an individualized treatment plan is developed with a comprehensive oral hygiene instruction program and a recording of influencing factors. Implementation of the appropriate clinical procedures includes removal of bacterial plaque and calculus through deep scaling, root planing, and polishing, and an evaluation of the patient's progress at appropriate intervals to reinforce the preventive regimen determined by the dental hygienist (Kraemer & Gurenlian). Additional treatments may include any of the following: fluoride application, applying desensitizing agents, irrigation, and amalgam recontouring.

Standards for Clinical Therapy

The Dental Hygiene: Definition and Scope document begins the description of clinical care by establishing that the environment provides the necessary "human resources and client care policies" (p. 8). Through the use of a consultative process, the dental hygienist would make decisions "regarding facilities, equipment, supplies and procedures" as well as "develop policies affecting the members of the oral health team and the care they provide" (p. 9). Dental hygienists must "maintain and apply current knowledge and skills; implement current infection control protocols; adhere to protocols which ensure physical safety and enable response in emergency situations; provide comprehensive dental hygiene care; ensure privacy/confidentiality; maintain records; access, assess and use technology/equipment; discuss, plan and coordinate client care" (p. 10). This requires the dental hygienist to obtain continuing education, consultation with colleagues, updates on current knowledge, and maintain a practice level which is consistent with "the national practice standards" (p. 11).

Dental hygienists must keep ongoing and effective records: "pertinent and current client demographic and psycographic information; pertinent and current medical/dental history; findings from intra and extra oral examinations and their interpretations; diagnostic tests such as radiographs and interpretations of results; the client's treatment record (overall treatment plan, treatment and counseling provided and treatment progress); ensuring confidentiality of all records and appropriate release of information" (p. 11).

To ensure active client participation in developing a plan, the document states that a mutual agreement of "specific short-and long-term oral health goals" (p. 14) by the client and the dental hygienist, "with client interests having highest priority" (p. 14) is required. This includes discussion concerning the cost of the treatment with the client. Appropriate members of the health team are included in the treatment plan discussions.

The Dental Hygiene: Definition and Scope (1994) document clearly defines "current infection control procedures" and "provision of care in emergency situations" (p. 16), including the "safe management of hazardous wastes" (p. 16). During the implementation phase, dental hygienists must avoid "unnecessary procedures" and manage their client's pain and anxiety by "discussing options for control of pain and anxiety with the client" (p. 17).

The evaluation of clinical care includes the use of "indices, instrumentation and observation to assess the presence of disease and changes in oral health status and plaque control", while "using continuous self-evaluation to ensure adherence to practice standards" (p. 18). The outcome of reviewing records is to determine the "effectiveness of care over time" by "assessing how improved oral health contributes to the client's health status" (p. 19).

Health Promotion

The three mechanisms for accomplishing health promotion as Epp (1986) defined in Achieving Health for All: A Framework for Health Promotion, appear in Clovis's (1994) article: "self-care, mutual aid and healthy environment" (p. 96). The three major strategies for achieving the mechanisms were also identified: "fostering Public Participation, strengthening Community Health Services, and coordinating Health Public Policy" (p. 96). Health promotion involves providing people with equal opportunities to access resources and to achieve their fullest health potential. In dental hygiene this could be achieved through increased consumer awareness of dental health education and preventive messages or by providing alternative settings for dental care (Brunet, 1992).

According to Canada's Health Promotion Survey 1990 Technical Report (1993), "high income earners, young adults and children, higher educated individuals and women are all greater users of dental care services" (p. 219). Therefore, target populations should include Canadians with less schooling, and those who are from lower socio-economic groups. Clovis (1994) emphasized that the rapid and dramatic changes in Canadians' oral health status and health care needs are due to the aging population, increasing numbers of poor single parent families and immigrants, and the higher birth rates among Indian and Inuit populations where there are typically "higher rates of oral health problems" (p. 94).

Brunet suggests a collaboration with "other oral health professionals, with other health care professionals, as well as with consumer and community organizations" (p. 24). Dental hygienists can educate other health care professionals and the public with respect to health care practices and collaborative health care delivery (MacDonald, 1993). Patients present with problems such as anorexia and bulimia (Ediger, 1994), abusive relationships (Gillespie & Denham, 1994; Wilson, 1993), tobacco and alcohol abuse (Kassirer, 1994), or high blood pressure; these patients need to be referred to another community resource or to the appropriate health care professional (MacDonald, 1993). Consultations could occur with psychologists, allergists, speech therapists, nurses, forensic specialists, oncologists, and voice specialists (Dickoff, 1988).

Brunet stated that dental hygienists could increase visibility and credibility if they "distribute their own business cards, volunteer for cable television interviews and represent dental hygiene on boards of community agencies or multi-disciplinary health care groups" (p. 24). In addition, the curriculum could provide "group process skills, and cultural and language sensitivity training" (p. 24).

Health promotion also extends to the dental hygienist: protection from carpal tunnel syndrome, back problems, contamination, and latex allergies (Snyder & Settle, 1994). Education in the areas of insurance and self-care is a responsibility of the dental hygiene profession and should be included in the curriculum.

Standards for Health Promotion

The Dental Hygiene: Definition and Scope (1994) document states that the dental hygienists' practice environment provides a consultative process to "make decisions regarding clients, processes, and resources" (p. 9). Dental hygienists must also have opportunities to use a consultative process to "develop policies to support healthy lifestyles/environments/communities" (p. 9). Unique to the health promotion responsibility is allowing the dental hygienist to "act as a role model" and to "discuss, plan and coordinate health promotion programs and activities" (p. 10).

According to the Dental Hygiene: Definition and Scope (1994) document, dental hygienists, as registered professionals, must adhere to practice standards and a code of ethics. Services are individualized to reflect "social, cultural, personal and environmental factors" (p. 12). Cooperation with "other professionals, government agencies, external agencies, and clients" (p. 12) is also a part of professionalism.

Assessment would be achieved by "collecting baseline information to substantiate and direct program or activity development; reviewing and updating previously collected information; analyzing information against established determinants of health and health outcome measures to determine program/activity priorities" (p. 13). All of this developing of programs is "within the limitations of existing resources" (p. 14). This could be achieved by "using a systems approach for program planning and developing target marketing strategies for health promotion initiatives" (p. 14). There must also be a "documenting process and outcome measures to ensure that records are available" (p. 15).

Dental hygienists "ensure that the client is an active participant in developing a plan by designing a plan which considers factors such as client literacy and age level and builds on strengths, ensuring that development proceeds in a culturally appropriate manner" (p. 15). The objective of customizing the treatment plan is to implement appropriate care and to monitor treatment strategies in order to ensure the promotion of the client's health and his/her self-care.

Dental hygiene expertise extends to a "multi-disciplinary team" where "current health promotion techniques (p. 17) are utilized, which requires a knowledge of "current technological options"(p. 17). "The dental hygienist incorporates ongoing evaluation by supporting and promoting coalitions between special population groups and health professionals" (p. 18). Revisions to evaluation findings are made by "modifying initiatives and evaluating programs based on outcome measures, changing needs and new information" (p. 18).

The outcome of health promotion is evaluated in three ways: "assessing the client's satisfaction with the services received using data collection instruments and processes; evaluating the impact of oral health initiatives against program indicators, specific targets of baseline data; determining the need for program additions, revisions and deletions" (p. 19).

Education

Dr. Fones, in 1913, emphasized the need for teaching dental patients their responsibility for home care of the mouth (Quinn & Black, 1961). The initial dental hygienists were trained at state teacher-training institutions (Sisty-LePeau & Nielson-Thompson, 1989). Psychology has been included in the dental hygiene program from the beginning to familiarize dental hygienists with motivational skills and behavior modification techniques (Quinn & Black, 1961). Quinn and Black included the following in the fields for dental hygiene employment: teacher, home visitor, counselor for expectant mothers and professional advisor to parents and teachers.

The dental hygiene curriculum includes psychosocial theories of motivation and compliance in order to provide the dental hygiene students with educational strategies. Appointment planning is based on the continuous assessment of the patient's needs and abilities. Kraemer & Gurenlian (1989) stated the components of an educational plaque control program: "patients oral health status, age, motivation, dexterity, educational level and background, dietary habits, and medications, as well as compliance factors" (p. 233). There are educators who suggest that there may be a need to increase the length of dental hygiene programs in order to accommodate an increase in the determination of the overall oral health status of the patient (Abraham & Kostiv-Cirincione, 1990: Paarmann, Herzog, & Christie, 1990).

New self-care products are constantly being presented to the public: anti-microbial rinses (Simmard & Landry, 1994), tartar fighting toothpastes, whiteners (Johnson, 1992). Research reveals new guidelines for dental procedures: rubber cup polishing versus airpolishing (Miller & Hodges, 1991); universal fluoride application or identification of high risk groups; mercury poisoning from amalgam (Mjor & Um, 1993); lasers (Crawford, 1992); and dental implants (Lockhead, 1993). The patients are made aware of the risks of infection and require assurance that the dental team is informed and providing the necessary protection (Laboratory Centre for Disease Control, 1994). Legislative changes result in decreases in funding for seniors, handicapped persons, and welfare recipients, and they request an explanation of the fiscal constraints. Dickoff (1988) commented on how dental hygienists are in the unique position of educating the patients without intimidating them: "Dental hygiene may be conceived as a prime entry point to careful surveillance, an entry point not likely to be avoided from fear, economic reticence, or sense of being frustrated by the encounter" (p. 28). Higher consumer comfort results in greater participation by the informed patient in the process of their own dental care (Pimlott, Chambers, Feller, & Scherer, 1985).

Standards for Education

In the Dental Hygiene: Definition and Scope document, education is facilitated by "using a consultative process in developing policies affecting teachers/learners and teaching/learning activities" (p. 9). Dental hygienists "discuss, plan and coordinate educational programs and activities" (p. 10). In order to accomplish this responsibility, the dental hygienist must have "current knowledge of dental hygiene and other relevant content areas such as clinical dentistry" (p. 11).

Effective assessment of educational needs requires "collecting, analyzing and interpreting required information; reviewing and updating previously collected information; and defining problem, cause and effect through co-discovery with the client" (p. 13). "The dental hygienist ensures the client is an active participant in developing a plan by: selecting teaching strategies appropriate for the client's needs and interests; considering available resources and the suitability of the learning environment, including such variables as group size and time" (p. 14). Priorities must be established when determining the components of the plan. Dental hygienists must identify how the goals will be met by "choosing educational processes, motivational techniques and educational material suitable for the client" (p. 15), and "determining how goal achievement will be measured" (p. 14).

Educational responsibilities are provided by "implementing current educational strategies based on established principles; ensuring client access to resources, implementing the plan developed and making revisions as necessary; using current educational techniques" (p. 17). The outcomes of educational responsibilities includes the following: evaluating the client's knowledge with specified educational goals, using data collection, discussion, questioning and observation; comparing the client's knowledge with the specified educational goals, using data collection instruments and processes; assessing the client's satisfaction with the knowledge acquired and results achieved using discussion, questioning and observation; and determining the need for additional knowledge and alternative educational strategies" (p. 19).

Administration

Areas of administrative responsibility of dental hygienists addressed in this study are the following: performance evaluation, recall systems, collection of health data, collaboration with dentists and allied health professionals, and role differentiation by level of education.

Performance evaluations are used for hiring and for determining merit raises or promotion (Barr, 1993). They define competency and job performance through the use of an objective grading scale. Barr stated that "The more specific you are in the description of that ideal staff member you wish to develop, the greater the chance that you will indeed create that person" (p. 53). Dental hygienists could assist their employer in developing the office philosophy and their job description, which allow them to have a voice in the direction of the organization/practice.

Recall systems should be a part of the dental hygiene curriculum because, as Woodall's study (cited in Graves and DeBiase, 1989) pointed out, "a prevention-oriented practice values a reliable recall system for ensuring a patient's return for regular evaluation and preventive care" (p. 79). The Accreditation Process and Education Requirements state that "A patient recall or referral system must be available; The patient recall or referral system should be audited or evaluated on a yearly basis" (p. 36). A good recall system in an educational program will allow students to monitor changes in their patients' attitudes , knowledge and skills (Graves et al.).

The dental hygienist plays a significant role in health history data collection for new and recall patients. Campbell, Shuman and Bauman (1993) believe that "Educational programs for entry-level and practicing dental hygienists should emphasize effective interviewing to gather patient health history data" (p. 378). Campbell et al. demonstrated that dental hygienists were performing the majority of the medical history examinations. Therefore, from an administrative perspective, it is imperative that dental hygienists be taught to communicate this information to the appropriate dental or allied health professionals.

The 21st century holds new challenges in oral health education and promotion (Brown & Larsen, 1993). Limited government resources will result in changes in the area of dental coverage and third party reimbursement mechanisms. Dental hygienists, along with other allied health professionals, will have to demonstrate their role in the provision of primary care and inform legislative bodies, regulatory agencies, and others in order to attain their support (Brand, 1994). For dental hygiene, this requires a continued focus on the periodontal skills of the dental hygienist in both educational programs and continuing education programs for dental hygienists (Uldricks, Hicks, Whitacre, Anderson, & Moeschberger, 1993). The dental hygiene profession and educators need to expand the dentists' and the publics' awareness of "dental hygienists' capabilities in assessing and providing initial therapy" (Uldricks et al., p. 29). This may be achieved by dental hygienists and dentists working collaboratively in educational settings in an effort to develop realistic mutual expectations and successful interactions (Kee, A. & Darby, M., 1986).

Brown and Larsen (1993) addressed the need for a collaboration between dentists and dental hygienists in order to provide "greatly needed oral healthcare to children, the elderly, the institutionalized, those without access, and those unable to afford oral healthcare in traditional settings" (p. 406). Dental hygienists whose primary employment has been in private practice, are moving into community-based settings (Brand, 1994) and business positions. The managerial positions described by Abraham and Kostiw-Cirincione (1990) include "professional business associates, dental health program administrators, clinic coordinators in hospitals or other health care organizations, nursing home dental service directors, and sales representatives in dental industry" (p. 30). There has been substantial support for an increased emphasis in the dental hygiene curriculum on practice management and related topics concerning professional relationships and equipment design (Stewart & MacMillan, 1992). This would require courses in managerial skills such as planning, organizing, directing and controlling. Education in healthcare delivery, mental health, health education and sociodemographics could also be considered in order to prepare dental hygienists to more effectively meet the needs in target areas.

However, Rigolizzo-Gurenian and Gluch-Scranton (1986) suggest that different practice levels should be defined to accommodate the different levels of education. Perhaps the personnel management courses as well as budgeting and marketing are better suited to a BSc - Degree Completion Program than a diploma program. This would likely attract different candidates who would focus on statistics for conducting research and improving writing skills to accommodate their administrative and managerial roles (Abraham & Kostiw-Cirincione, 1990). Options in computing, economics and accounting would also be required.

Gilboe (1990) states that "Major curriculum revisions are required to adequately prepare graduates to serve the altered demographics and disease patterns of the Canadian population" (p. 756). Paarmann et al. believe that a degree program would level the playing field for dental hygienists and other health care workers by "(1) providing a foundation for understanding and appreciating the complexities of human potential and existence as they influence health, (2)...critical thinking..(3) laying a foundation for development of graduate programs with a strong research base" (p. 199). It is the responsibility of the dental hygiene profession to determine the need for providing different levels of education and corresponding education standards.

Standards for Administration

The Dental Hygiene: Definition and Scope (1994) document includes specific details concerning the "policy development and management processes which may occur in any dental hygiene practice setting" (p. 2). Dental hygienists ensure or promote that support and resources will be available to enable them to "implement current policies and protocols related to the position" (p. 10). This requires them to "maintain pertinent and current information relating to policies and protocols" (p. 11). Dental hygienists are required to be familiar with their practice standards and their legal responsibilities; to engage patients in collaborative treatment planning; and review and revise their responsibilities.

Dental hygienists ensure that they have the opportunity of "using a consultative process to make staffing decisions according to needs, available positions and funding" (p. 9). Individualized service is based on the client's needs and the dental hygienists determine their capacity in the client's treatment plan by "analyzing the job requirements in terms of the areas of responsibility within the role of the dental hygienist" (p. 12). Activities that reflect the client's requirements are selected and implemented by the dental hygienist and must be "reviewed and revised" (p. 12). In providing dental hygiene services, dental hygienists need to continue "advocating for changes in the job description to more effectively meet needs in target areas" (p. 17).

The dental hygienist requires systems to manage information through "tracking and reporting mechanisms" (p. 11). Since the "client is an active participant in developing a plan" (p. 14), it is necessary to make certain assurances: "obtain input from appropriate client representatives, identifying and discussing priorities, reaching mutual agreement regarding desired outcome with client interests having highest priority...determining how goal achievement will be measured" (p. 14). There also needs to be discussion and surveillance to determine "the client's perceptions of changes" (p. 18), and their "satisfaction with the program/activity"(p. 18).

Administrative standards include "ensuring the practice setting meets all legal requirements for workplace health and safety" (p. 16). Dental hygienists must review "operational processes to determine effectiveness and efficiency in terms of goals, targets and timelines", as well as "determining strategic and/or operational planning requirements" (p. 19).

Research

The dental hygiene profession is responsible for the education and development of new professionals who will serve the public in a competent manner (Boyd, 1993). Part of this responsibility is providing a foundation in research methodology. The purpose of research is to disseminate new information to the profession and to other fields of science (Phillips, 1959). Bawden (1983) believes that "If dentistry is to maintain its status as a learned profession, it must sustain a vigorous research component of such quality that it improves our ability to prevent and treat dental disease and makes a significant contribution to the body of knowledge associated with the biomedical and behavioral sciences in general" (p. 289). The same is true of dental hygiene, especially with the move towards self-regulation.

Hine (1966) identified some of the benefits of undergraduate student participation in research:

> 1. Students assigned to a research problem under the close and thoughtful guidance of a competent research investigator should receive some of the same benefits received by more mature investigators; a knowledge of the pertinent literature, some experience in analysis and research design, and excitement when new findings occur;
> 2. Students can get some experience in "problem solving";
> 3. Some students may be attracted to graduate school, and a few to a career in teaching and research;
> 4. Most important, the student will learn to challenge the written word, to lose respect for much of what is in the literature and, it is hoped, will learn to evaluate what he reads or observes. (p. 1316).

Keller, Seydel, Kremenak and Kremenak (1993) agree that students who participate in research develop critical thinking skills and are "generally more sophisticated in evaluating research results than their peers who have not had such experience" (p. 371).

According to Hine (1966), research leads not only to a better understanding of oral health and disease, but also to "more competent faculty, better teaching, and better graduates" (p. 1319). Oliver and Legler (1983) stated that "new curriculum approaches should be explored to reflect advances in research and to correlate basic and clinical sciences" (p. 296). Schools must remain current and adjust their curriculum when research verifies a scientific basis for the change. Educators cannot cover all the topics in their area, and research allows students to add to the sum total of knowledge in their dental hygiene program. This benefit will extent to the clients that the graduate encounters.

Faculty research productivity also appears to increase if students are encouraged to participate in research (Keller et al., 1993). Experienced faculty researchers provide useful suggestions and criticisms for the students and for the junior faculty (Keller et al.) Since issues of promotion and tenure are increasingly dependent upon research activity, it benefits everyone when faculty encourages students to participate in research projects. Clarkson and Kremenak (1983) proposed a formal mentorship with a faculty member, who would assist the student in developing a well-focused proposal. This would require a background which includes courses such as research design, analytical techniques, data collection and statistical analysis, and literature reviews (Clarkson & Kremenak, 1983; Hunter, McLeran, Brine, 1980). Through the use of a variety of forums, the students would be able to present their research findings. In turn, students would foster an interest in continued education and learning. Oliver and Legler (1983) commented that "an openness to new information and an ability to evaluate critically research findings are desired end points" (p. 296).

Another concern that Oliver & Legler (1983) noted was that of dental schools, "attracting funding from industry, foundations, specific contractual sources, or other nontraditional sources of support (p. 296). Successful research and development also requires cooperation with other disciplines in the university. For example, the behavioral scientist could work with the clinician, adding to the methodology and the logic of the investigation (Milgrom, Weinstein, and Smith, 1984). Enhancement of research collaboration should extend to the dental hygiene community and to other professional communities in order to affect a change in policies, standards and legislation. (Spolarich, Peterson-Mansfield, Shuman, Davis, and Barry, 1994). Increasing the visibility and support of dental hygiene research will enhance the profession's ability to promote the health and well-being of the public.

Research programs educate students in the scientific methods of approaching new problems and in the establishment of sound theory which guides education and practice (Spolarich et al.). Brunet (1992) emphasized that "Research is required, particularly in the areas of consumer needs, cost-effectiveness and innovative ways of improving access to care and information" (p. 24). The reduction of caries prevalence and emphasis on new bonding materials must be reflected in the curriculum. The special needs of ethnic groups, children, the elderly, the poor, and other target groups must be addressed (Spolarich et al.). The etiology of periodontitis and the need to improve diagnostic and treatment skills will change the focus of dentistry. Dental hygienists must remain current and capable of understanding the implications of the new discoveries in their profession and in associated health professions.

Standards for Research

The Dental Hygiene: Definition and Scope (1994) document states that dental hygienists have the responsibility to use a "consultative process in developing policies related to research activities" (p. 9). This requires an ability to perform an assessment by: "identifying resources that may be helpful in selecting a research topic; conducting appropriate reviews of the literature; identifying and utilizing guidelines for effective research problem/question formulation; and stating the hypothesis of the research question or identifying the nature of qualitative research" (p. 13).

Research responsibilities also require the dental hygienist to be able to "gather, record and analyze the data, and meet criteria for ethical research" (p. 11). Dental hygienists must obtain "informed consent from subjects involved in clinical trials following discussions of risks, benefits, rights and choices" (p. 14). Once the dental hygienist has established that the research project is acceptable to the client, she/he then designs the research study, identifies needs and resources for funding, and prepares a funding proposal (p. 14). While conducting research, the dental hygienist must adhere to "accepted research protocol" (p. 17).

Evaluation of the research is accomplished by monitoring results in relation to expected outcomes; comparing results with other published studies; consulting with colleagues/subjects; and using continuous self-regulation to ensure adherence to practice standards" (p. 18). "The dental hygienist make revisions based upon evaluation findings by identifying further research requirements or questions. The outcome of conducting research is "seeking critiques from appropriate sources; reporting or publishing results; and analyzing and applying research findings to the dental hygiene process of care" (p. 19).

Demographics

The demographics of dental hygienists vary throughout the world and even within each country, depending on the educational institution, the jurisdiction of practice, and the individuals practice setting. Globally, Canada and the United States are the only countries offering a Baccalaureate in Dental Hygiene and a Masters program is only offered in the United States (Johnson, 1992). Self-regulation of dental hygiene has only occurred in British Columbia, Alberta, Quebec, and Ontario (Strivens, 1993; Walker, Juchli, Pimlott, 1993). As mentioned in the introduction, this allows the professional association to control licensure, education and practice. The remaining provinces are regulated by the College of Dental Surgeons.

Transferability was an issue addressed by the National Commission on Allied Health Education (1981); they recommended that allied health students should be provided with "at least the minimum knowledge and skills needed to perform effectively in an occupational role in any geographic location or setting in the nation (cited in Paarmann et al, p. 203). Therefore, we need education standards to regulate the educational institutions. To insure portability within the Canadian work environment, courses such as local anesthetic will have to be included in the curriculum of every dental hygiene program.

There are 23 dental hygiene programs in Canada: four in British Columbia, one in Alberta, one in Saskatchewan, one in Manitoba, fourteen in Ontario, one in Quebec, and one in Nova Scotia. The dental hygiene programs are: Camosun College, Victoria, British Columbia; College of New Caledonia, Prince George, British Columbia; University of British Columbia, Vancouver, British Columbia; Vancouver Community College, Vancouver, British Columbia; University of Alberta, Division of Dental Hygiene, Edmonton, Alberta;

Saskatchewan Institute of Applied Science Technology, Regina, Saskatchewan; University of Manitoba School of Dental Hygiene, Winnipeg, Manitoba; St. Clair College of Applied Arts and Technology, Windsor, Ontario; Confederation College, Thunder Bay, Ontario; Fanshawe College of Applied Arts and Technology, London, Ontario; Seneca College, North York, Ontario; George Brown College, Toronto, Ontario; Canadian Forces Dental Services School, Border, Ontario; Durham College Dental Hygiene Program, Oshawa, Ontario; Algonquin College, Nepean, Ontario; Cambrian College, Sudbury, Ontario; Canadore College, North Bay, Ontario; University of Toronto School of Dental Hygiene, Toronto, Ontario; La Cite Collegiale, Ottawa, Ontario; Niagara College Welland, Ontario; Georgian College, Orillia, Ontario; John Abbott College, Ste Anne de Bellevue, Quebec, and Dalhousie University School of Dental Hygiene, Halifax, Nova Scotia.

Educational Institutions

The number of students in Canadian dental hygiene programs varies from 4-8 at the Canadian Forces Dental Services School to a student body of 80 at Dalhousie University School of Dental Hygiene (the mean is approximately 30 students). The post dental hygiene diploma degree completion program at the University of British Columbia has five full-time and seven part-time students (Canadian Dental Hygiene Association, 1994, July/August). University of British Columbia's Faculty of Dentistry offers a masters program that leads to a Master of Science in Dental Science, and has two dental hygiene students currently enrolled (CDHA, 1994).

The Canadian Forces Dental Services School selects candidates who are military dental assistants and offers a seven-month dental hygiene course with full accreditation status (CDHA, 1994b, p. 148). Ontario dental hygiene programs provide a "one + one" program: one year in the dental assisting program followed by one year in the dental hygiene program. Saskatchewan has approved a "Direct Entry Two Year Program" which allows Grade 12 graduates access to Dental Hygiene education without being a Certified Dental Assistant with two years experience, or a Dental Therapist prior to entry (CDHA, p. 151). Meanwhile, the University of Alberta have recommended a prerequisite year of university studies prior to entry into their two-year dental hygiene program, which is in keeping with the present policy at numerous community colleges and universities in North America. The University of Alberta Dental Studies Task Force (1994) commented on the changing profile of dental hygiene students: "Forty of the sixty-five students admitted in September 1994 have one or more years of post-secondary education with eighteen of these students having completed three or more years of study" (p. 6). The Dental Studies Task Force also advocated baccalaureate education as the minimal educational requirement for "entry to practice" (p. 5). Wayman (1985) commented on dental hygiene programs in the United States: "67 percent of associate/certificate programs have lengthened their curricula, indicating that two years is no longer sufficient to prepare a practitioner for current, comprehensive practice under a myriad of supervisory conditions" (p. 136). This diversity in the length of the dental hygiene programs complicates the task of developing national education standards.

Jurisdiction of Practice

Current policies and processes concerning the regulation of the dental hygiene profession vary from province to province. Political and financial influences which affect dental hygienists include national and provincial legislation, professional associations, National Health Services, and universities (Clovis, 1994). Issues that are included in this section on jurisdiction of practice include supervision and regulations regarding scope of practice.

Varying levels of supervision depend upon whether the dental hygienist is practicing in community health, private practice or institutions. Health and Welfare Canada (1988) stated the following definitions of supervision which the Canadian Dental Hygienists' Association has adopted:

> Direct Supervision: A dentist diagnoses and prescribes treatment for a patient and delegates procedures to the dental hygienist. A dentist is physically available while the dental hygienist delivers treatment.
>
> Indirect Supervision: A dentist diagnoses and prescribes treatment for a patient and delegates procedures to the dental hygienist. A dentist need not be physically present while the dental hygienist delivers treatment.

> General Supervision: A dentist is cognizant of dental hygiene procedures being performed but has not necessarily made a diagnosis. (p. 73)

In all provinces, dental hygienists in community health are permitted to have general supervision. "In British Columbia, dental hygienists have worked for decades under the direction of dentists, as opposed to direct or indirect supervision, without any deleterious effects to the patients treated" (Health and Welfare Canada, p. 74). Alternative settings such as mobile health service for the elderly, the institutionalized and the remote Northern communities (Bassett & Woods, 1992; Canadian Dental Hygienists Association, 1992) demand general supervision for dental hygienists.

In Ontario, the scope of practice, as stated by the Hon. F. Lankin, Minister of Health in Ontario (1991) was as follows: "The practice of dental hygiene is the assessment of teeth and adjacent tissues and treatment by preventive and therapeutic means and the provision of restorative and orthodontic procedures and services" (p. 1). In Strevens' (1993) article concerning Ontario Regulated Health Professions Act, "A member (dental hygienist) shall not perform a procedure under the authority of section 4 unless the procedure is ordered by a member (dentist) of The Royal College of Dental Surgeons of Ontario" (p. 99). There was discussion by the new governing body, a Transitional Council for the College of Dental Hygienists (October, 1992), concerning the term "is ordered" (Strevens, 1993). They addressed the two fundamental elements of the new Health Disciplines Act: "Accessibility to care, and choice of health care provider by consumers" (Strevens, p. 99). On December 31, 1993, the College of Dental Hygienists of Ontario (CDHO) commenced the governing of their own regulatory body. The Canadian Dental Hygienists' Association (1994a) reported that in Ontario, "Dental hygienists are now legally entitled to perform their "authorized acts" of scaling and root planing without the supervision of a dentist provided that the procedures have been "ordered" by a registered dentist" (p. 51). Self-regulation in Ontario has allowed the public to have direct access to dental hygiene treatment and this increase in autonomy leads to increased accountability for the profession (Walker, Juchli, & Pimlott, 1993; Canadian Dental Hygienists' Association, 1994a).

Regulations regarding scope of practice are determined by the regulatory agency in each province. The list of allowable duties or the definition of dental hygiene practice is dependent upon the courses taught in the dental hygiene curriculum in the respective province. Alberta's Dental Profession Act (328/84), section 51(1), states: "'dental hygiene' means the educational, preventive and therapeutic services, procedures and practices that a graduate in the course of dental hygiene in the faculty of dentistry at the University of Alberta has been taught in the curriculum in the 1981-82 and 1982-83 university years". In Manitoba, the provision of restorative dental services by dental hygienists has been taught and practiced since 1972 (Health and Welfare Canada, 1988). Cessford and Kravtsov (1994), in their study concerning the attitudes and level of restorative dental services provided by Manitoba dental hygienists, established the following:

> All graduates of the University of Manitoba, School of Dental Hygiene must successfully complete the restorative portion of the curriculum. This is similar to the structure of the programs at Dalhousie University and in Quebec. (p. 25)

Dental hygienists who graduated from programs which include restorative dental services in their curriculum may only be allowed to practice those skills in certain provinces, depending on the current legislation. For example, a dental hygienist who graduated from British Columbia would be allowed to administer local anesthetic to the client. However, the same dental hygienist could move to Manitoba and be unable to administer anesthetic to the clients there because the legislation does not permit that treatment. Unfortunately, the British Columbia dental hygienist would also not be allowed to provide restorative services for clients because she/he did not graduate from Manitoba.

In Saskatchewan, only dental hygienists who were previously trained as dental therapists are allowed to provide restorative services (Health and Welfare Canada, 1988). The Transition Council of the College of Dental Hygienists of Ontario, stated that as a restorative dental hygienist the applicant must "obtain a certificate in a specialty program in dental hygiene in a Faculty of Dentistry of College of Applied Arts and Technology in Ontario" (p. 49). The Yukon's Dental Profession Act (1994) specifically limits the administration of local anesthetic solutions, the placement of prescribed restorations, the performance of vital pulpotomies for deciduous teeth, and uncomplicated extractions to dental therapists. However, the issue of supervision is the same for the dental hygienist and the dental therapist: "Any dental hygienist or dental therapist who is authorized by a dentist to perform any dental service pursuant to this section may perform such service pursuant to the direction of that dentist, but not necessarily under the immediate supervision of that dentist" (p. 8).

Newfoundland's Dental Auxiliaries' Regulations (1985) states that "Dental Hygienists who have been trained in restorative duties, and who have been approved in writing by the Board may perform" restorative duties (p. 5). This also applies for orthodontic training. However, Newfoundlands' Dental Hygienists cannot do the following:

a) perform any treatment or procedure of an irreversible nature;

b) cut any tissue;

c) engage in diagnosis;

d) engage in treatment planning; or

e) administer drugs. (p. 6)

Supervision can be direct or by written order. The Newfoundland Dental Board defines "direct supervision" as meaning "the availability of a licensed dentist within a reasonable period of time" (p. 1), which suggests that the dentist does not have to be on the premises.

Regulation No. 7 from Nova Scotia's Provincial Dental Board (Moody, 1992) states the same regulations concerning restrictions to treatment that Newfoundland's Dental Board states with the following additional limitations: no prescribing drugs; and no prescribing or designing any intra-oral appliance or prosthesis. The Act Respecting Dentistry states that the practice of dental hygiene must occur "(a) under the supervision of a Licensed Dentist, or (b) with the written permission of the Board granted pursuant to Section 17 (2) (a) of the Act" (p. 7). Therefore, dental hygienists who are employed by the Department of Health and working within the Province of Nova Scotia are subject only to general supervision of a dental consultant from that department. Continuing education is mandatory in Nova Scotia and is a prerequisite to licensure.

Individual Practice Settings

Dental hygiene practice occurs in a variety of settings. Health and Welfare Canada (1988) identify the traditional settings:

> Traditional settings include private dental practice (general and specialty practice in solo and group practice arrangements), community health (federal, provincial, regional and municipal government programs), educational institutions, the Armed Forces and hospitals. (p. 5)

Additional settings include institutions other than hospitals (correctional institutions and senior centres), dental industry, union and corporate dental clinics, research institutions, and insurance agencies (Health and Welfare Canada, 1988).

The majority of dental hygienists practice in private dental practice: 82% in Canada (Health and Welfare Canada, 1988). This is similar to the estimate by Johnson (1992): private dental practice "accounted for at least 85 per cent of workplaces for Canada, Japan, Nigeria, Switzerland, the United Kingdom and the United States" (p. 454). The Health and Welfare study determined that "Community health settings account for about 10 per cent of positions and post-secondary educational institutions for more than five per cent. Positions in all other practice settings account for slightly over two per cent of the total" (p. 5). The vast majority of private dental hygiene practitioners worked for general dental practitioners rather than for specialists (Johnson, 1992).

Summary

The literature examined in this chapter focused on the five primary responsibilities of dental hygienists and the demographics of dental hygienists. The introduction described the rationale behind the Canadian Dental Hygienists' Association's decision to reexamine the practice standards document: who would benefit from the clarification of the graduate dental hygienists' competencies; an explanation of the roles and responsibilities of dental hygienists; and the legal accountability of dental hygienists, especially in light of the future move to greater independence.

The section on Clinical Therapy gives a historical account from Fones to the present. Clinical therapy includes interceptive, therapeutic and maintenance responsibilities. Comprehensive oral health care includes comprehensive diagnosis, implementation of appropriate clinical procedures, active client participation, ongoing and effective records, and assessment of the client's oral health care.

The section on Health Promotion focuses on providing the client with techniques for self-care, mutual aid and a healthy environment. Target populations are identified in collaboration with other health care professionals, consumers, and community resources. This is achieved while adhering to practice standards and a code of ethics. Assessment is achieved by determining a baseline, analyzing the data, implementing appropriate care and monitoring the treatment strategies. Proper analysis requires a knowledge of current technological options.

The Education section draws on psychology to familiarize dental hygienists with motivational skills and behavior modification techniques. In order to improve client participation, the dental hygienist must select appropriate teaching strategies, and consider the client's available resources and priorities. Continuous assessment through the use of data collection instruments, discussion and observation is necessary for effective oral health care. Dental hygienists must remain current, because they could become the prime entry point into oral health care.

The Administration responsibilities included performance evaluation, recall systems, collection of health data, collaboration with dentists and allied health professional, and role differentiation by level of education. Proper communication of information to other health care professionals is essential. Dental hygienists are also called to be proactive by informing legislative bodies, regulatory agencies, and others in order to attain support. They are in a position to provide care to marginalized people in target areas. Information must be managed through tracking and reporting mechanisms. Dental hygienists are also responsible for monitoring their individual work places for safety, and operational effectiveness and efficiency.

The final responsibility defined in the literature review was Research. The purpose of research is to disseminate new information to the profession and to other fields of science. Participation in research leads to the development of critical thinking skills and an openness to new information. Research collaboration affects a change in policies, standards and legislation. Dental hygienists must remain current and capable of probing the new discoveries in their profession and in associated professions.

The section on Demographics deals with the variance in dental hygienists due to the individual educational institution they attended, their jurisdiction of practice, and their individual practice setting. The educational institutions vary in size, length of program, and degree attained. The jurisdiction affects their legislation which defines the level of supervision and the duties that the dental hygienists are allowed to perform. The practice setting varies from private practice to community health, educational institutions, Armed Forces, hospitals, research, dental industry, and so on. The Canadian issue is one of transferability and National Accreditation for all the provinces and educational institutions.

CHAPTER 3

DESIGN AND METHODOLOGY

This chapter contains the research design and methodology. Included are an outline of the conceptual framework for the design of the survey; a description of data collection; an explanation of the data analysis process; ethical considerations; and a summary.

Research Instrument

The questionnaire instrument (Appendix D) that was utilized was adapted from the 1986 "National Survey to Develop Clinical Practice Standards for Dental Hygienists". The education standards are presently being developed as part of the practice standards document, and they contain the competencies expected of entry to practice level dental hygienists in Canada. The competencies in the questionnaire were organized according to the five primary responsibilities of a dental hygienist which were defined in the Dental Hygiene: Definition and Scope (1994) document: clinical therapy, health promotion, education, administration, and research.

The competencies from the Education Standards document and the Provincial Review of National Dental Hygiene Examination Competencies formed the foundation for the questionnaire. Since the University of Alberta's Dental Hygiene Program recently participated in the accreditation process conducted by the Commission on Dental Accreditation of Canada in February, 1995, the University's Course Information Guide for Dental Hygiene Students was examined to determine if there were any additional competencies being taught in their curriculum which were not defined in the education standards document. The course information guide also provided clarification and expansion of several competencies which were either confusing or vague in their original form.

For each statement, respondents indicated their judgment of the level of importance of each competency required for a graduating dental hygienist to be able to be qualified to provide oral hygiene care. The levels of importance were: very low, low, moderate, high and very high. Any comments about the competencies as they related to the participants professional experience were made in the "Comments" section. Any other competencies that the respondents believed were absent and should be included were written in the "Comments" section.

Data Collection

This section on data collection includes an explanation of the following: the population and the sample used in this study; the pilot-test of the questionnaire; and the collection of the data.

Population and Sample

The population for this study was all dental hygienists registered in Western Canada (British Columbia, Alberta, and Saskatchewan) who have had a minimum of 50 days clinical practice or teaching over the last three years.

With the assistance of the Canadian Dental Hygienists' Association, a stratified random sample of 240 dental hygienists was selected for the content validation survey: 80 dental hygienists were selected from each of the three Western Canadian provinces.

Pilot-Test of Questionnaire

The questionnaire was pilot tested by ten dental hygienists: three from the University of Alberta faculty, one from the Alberta Dental Hygienists Association, one was the consultant for the Dental Hygiene: Definition and Scope (1994) document, one from a periodontist's office, and four from general practice. Modifications were made to the questionnaire to improve the construction of questions and to ensure ease of response.

Collection of Data

The cover letter which accompanied the questionnaires explained the purpose of the study to the potential participants (Appendix A). Questionnaires were mailed to participants on May 15, 1995, with the return date one month after initial mailing (June 5, 1995). The questionnaires were color coded as follows: British Columbia - Yellow, Alberta - Black, and Saskatchewan - Blue.

A follow-up reminder/thank-you letter (Appendix B) followed on May 29, 1995, three weeks after the questionnaire had been distributed: 39 surveys had been received by that date. Articles were written in the provincial newsletters to inform the dental hygienists of the study and to encourage their cooperation (Appendix C).

Data Analysis

Both quantitative and qualitative data were obtained from the survey. A Likert scale using five intervals (very low, low, moderate, high, and very high) was used for the closed ended responses. The level of measurement for the demographic data was nominal.

Once the questionnaires were received the ratings of importance for each competency were entered into an Excel program with accompanying code numbers to identify the respondents. Then the data were analyzed using the Statistical Package for Social Sciences (SSPS).

The competencies were grouped into five categories of responsibility which corresponded to the Dental Hygiene: Definition and Scope (1994) document: clinical therapy had 87 competencies; health promotion had 9 competencies; education had 17 competencies; administration had 20 competencies; and research had 6 competencies. Since the clinical therapy category had 63% of the competencies, further subcategories were developed to facilitate a more equitable representation of the importance of the competencies within each category. The nine clinical therapy subcategories were determined by grouping the competencies according to courses and clinical procedures within the University of Alberta's Dental Hygiene program.

The research problem was addressed through examination of six research questions. The data for each question were organized as follows:

Research Questions 1-6

1. Which clinical therapy competencies identified in the survey should be included in a dental hygiene preparatory education program?

2. Which health promotion competencies identified in the survey should be included in a dental hygiene preparatory education program?

3. Which education competencies identified in the survey should be included in a dental hygiene preparatory education program?

4. Which administration competencies identified in the survey should be included in a dental hygiene preparatory education program?

5. Which research competencies identified in the survey should be included in a dental hygiene preparatory education program?

6. Which preparatory level competencies occur in practice but are not identified in the survey?

The means and standard deviations for each of the competencies within the five categories were calculated in order to determine which competencies should be included in a dental hygiene preparatory education program. The categories were presented according to their overall mean, from highest to lowest importance. The competencies within each category were also ordered from highest to lowest.

The qualitative component consists of comments on the questionnaires which were transcribed and analyzed to determine which of the identified competencies should be revised or omitted; and which competencies the respondents identified as being absent from the survey. Comments derived from each section of the questionnaire were presented in their corresponding categories.

Research Question 7

7. How do selected demographic factors affect the dental hygienists' responses in each of the five categories of responsibility?

A profile of the respondents was generated from the demographic information: an analysis of variance was utilized to determine differences between provinces, educational qualifications, year of graduation, and current or most recent employment setting. Cross-tabulations for the different demographic characteristics were calculated to determine the relationship between the independent variables. Responses concerning the respondents profiles were reported in each of the five categories of responsibility: clinical therapy, health promotion, education, administration and research.

Where possible, tables and/or graphs were used to enhance the readability of the report.

Ethical Considerations

Ethical approval for this study was obtained from the University of Alberta Faculty of Education Ethics Committee. All participants received a covering letter outlining the basic information regarding the study, including a statement that participation in the study would be kept anonymous and confidential: participation in the study was voluntary and respondents were advised that they could withdraw at any time. Questionnaires were identified by number and analysis was concerned with the use of pooled data rather than individual responses.

To ensure anonymity during the study, only code numbers were used to identify the questionnaires.

Methodology Summary

The framework for the 1986 "National Survey to Develop Clinical Practice Standards for Dental Hygienists" was the basis for the development of the research instrument. The questionnaire was developed by examining the following sources: the Health and Welfare document, The Practice of Dental Hygiene in Canada (1988); the Education Standards Workshop Report (1994); the Provincial Review of National Dental Hygiene Examination Competencies (1995); and the University of Alberta's Dental Hygiene Curriculum Guide (1994).

A total of 240 individuals were contacted for the study. This included samples from the three Western Canadian provinces: British Columbia, Alberta, and Saskatchewan. Respondents were described according to four demographic factors: province, educational qualifications, year of graduation, and practice setting. Analysis of the information was through means and standard deviations, an analysis of variance for each competency, and cross-tabulations according to the four demographic factors.

CHAPTER 4

PRESENTATION AND ANALYSIS OF DATA

This chapter presents the results of the data which were obtained from the questionnaire. The demographic and background characteristics are presented in the first section.

In the second section, the five categories of responsibility are organized from highest to lowest means: education, administration, health promotion, research, and clinical therapy. The clinical therapy category is further subdivided into nine subcategories. An analysis of variance is utilized to determine the statistical significance between the independent variables (province, educational qualifications, year of graduation, and current or most recent employment setting) and the dependent variables: first the five overall categories (including the nine clinical therapy subcategories) are analyzed and displayed in figures; and then the individual statistically significant competencies in each of the five categories are identified and displayed in tables.

The third section contains the analysis of the competencies in the five categories of responsibility: clinical therapy, health promotion, education, administration, and research. Means and standard deviations were used to determine their rating of importance. The qualitative responses were examined to identify competencies which should be revised, omitted or added to dental hygiene education programs in order for a graduating dental hygienist to be qualified to provide oral hygiene care. The qualitative responses are presented with the corresponding competencies.

Demographic and Background Characteristics

This section describes the characteristics of the dental hygiene respondents according to province, educational qualifications, year of graduation, and practice setting. Of the 240 surveys that were distributed, there were 131 respondents (55%); 120 respondents (50%) met the "50 days clinical practice or teaching over the last three years" criterion. These usable respondents are identified as Group A in Table 1. The 11 respondents who did not meet this criterion are identified as Group B in Table 1. Only the provincial distribution includes Group B; the remaining three demographic categories describe the 120 usable respondents (Group A).

Provincial Distribution

Of the 120 usable surveys, 46 were from British Columbia, 45 were from Alberta, and 29 were from Saskatchewan. British Columbia had the largest number of qualitative responses (N=23) and Saskatchewan had the least (N=11). Table 1 indicates the total respondents in the usable, non-usable, and qualitative categories, according to province.

Table 1: Distribution of Respondents by Province

	A	B	QUALITATIVE
British Columbia	46 (38%)	3 (28%)	23 (43%)
Alberta	45 (38%)	4 (36%)	19 (36%)
Saskatchewan	29 (24%)	4 (36%)	11 (21%)
Total	120 (100%)	11 (100%)	53 (100%)

Educational Qualifications

The education categories were combined in Table 2 to distinguish the three groups of respondents: those with only a dental hygiene diploma (30.8%); those with a diploma plus other education (50.7%); and those with a Bachelor's degree in any discipline (18.5%). The respondents in the `Diploma + Other Education' category have certificates in dental assisting, dental therapy, or additional modules in orthodontics, local anesthesia, and/or restorative procedures. The respondents from the `Diploma + Other Education' provided the majority of the comments (64%), as indicated in Table 2. The respondents with only a dental hygiene diploma provided 21% of the comments, while those who have a Bachelor's degree in any discipline, provided 15% of the comments.

Cross-tabulations were calculated, as indicated in Table 2, to determine the relationship between the province and the education criteria. Saskatchewan had the greatest percentage of its respondents in the `Diploma & Other Education' category (79.4%), and the lowest percentages in the remaining categories. Alberta had the greatest number of respondents in the `Bachelor Degree' category (N=10) and in the `Diploma Only' category (N=18). The majority of the British Columbia respondents were in the `Diploma & Other Education' category (N=24) which was significantly greater than the number of British Columbia respondents in the `Diploma Only' category (N=14), and the `Bachelor Degree' category (N=8).

Table 2: Cross-Tabulations of the Respondents According to Province and Education

Count **Row Pct** **Col Pct** **Tot Pct**	**Diploma Only**	**Diploma & Other Education**	**Bachelor Degree**	**Row Total**
British Columbia	14 30.4 38.8 13.1	**24** **52.2** 37.5 16.9	8 17.4 37.5 6.9	46 38.5
Alberta	**18** **40.0** 50.0 14.6	17 37.8 26.6 13.8	**10** **22.2** 50.0 9.2	45 37.5
Saskatchewan	4 13.8 11.2 3.1	**23** **79.4** 35.9 20.0	2 6.8 12.5 2.3	29 24
Column Total	36 30.8	**64** **50.7**	20 18.5	120 100.0
Qualitative	11 (21%)	34 (64%)	8 (15%)	53 (100%)

Year of Graduation

Table 3 represents the year that the respondents graduated from their dental hygiene programs. The majority of respondents graduated from 1984-1993 (47%), and this group provided the most comments (53%). Graduates from 1974-1983 made up 37% of the accepted respondents; this group provided 36% of the comments. The respondents in the graduating classes from 1964-1973 represented 16% of the accepted respondents; this group provided only 9% of the comments.

Table 3: Distribution of Respondents by Year of Graduation

	A	Qualitative
***1964 - 1973**	20 (16%)	5 (9%)
1974 - 1983	44 (37%)	19 (36%)
1984- 1993	56 (47%)	28 (53%)
No Response	0	1 (2%)
Total	120 (100%)	53 (100%)

* There was one respondent in group B who graduated in 1954.

Practice Setting

The majority of the respondents were in general practice (67%); this group provided the most comments, as indicated in Table 4. The number of respondents who work in public health settings or in the post-secondary education category were similar (13% and 12% respectively). However, 11 of the 14 community health respondents provided comments in comparison with only 3 of the 16 educators who provided comments. There were only seven respondents from periodontal specialty practices.

In general, the respondents had a slightly higher representation from British Columbia and Alberta. The respondents were most likely to have a diploma plus other courses/certificates; to have graduated from 1984-1993; and to be employed in a general practice setting.

Table 4: Distribution of Respondents by Current or Most Recent Employment Setting

	A	Qualitative
General Practice	81 (67%)	34 (64%)
Perio Specialty	7 (6%)	5 (9%)
Community health	14 (12%)	11 (21%)
Post-Secondary	16 (13%)	3 (6%)
Other	1 (1%)	0
No Response	1 (1%)	0
Total	120 (100%)	53 (100%)

Analysis of the Five Categories of Responsibility in Relation to Demographic Factors

The data in this section are presented in relation to the five categories of responsibility: clinical therapy, health promotion, education, administration and research. The categories were ordered according to their means in Table 5. The mean for each category was calculated by determining the individual responses for each competency within each category and then calculating the overall mean of all of the individual responses. The category with the highest overall mean was Education (mean = 4.569), and the following categories were in descending order: Administration (mean = 4.174), Health Promotion (mean = 4.021), Research (mean = 3.707), and Clinical Therapy (mean = 3.606). The overall mean for the Clinical Therapy category was the lowest. However, clinical therapy was the largest category; 87 of the 139 competencies (63%). Therefore, to provide a more accurate representation of the importance of the categories according to their overall means, the Clinical Therapy competencies were regrouped into nine subcategories which are included in Table 5 in descending order of importance after the Education, Administration, Health Promotion, and Research categories.

Table 5: Means of the Five Categories and Nine Subcategories

Code	Category	Mean	Rank
E	Education	4.569	1
A	Administration	4.174	5
HP	Health Promotion	4.021	7
R	Research	3.707	8
C	Clinical Therapy: Overall	3.606	n/a
C1	Implement treatment	4.467	2
C2	Safety and preparation of the clinical environment	4.459	3
C3	Obtain client information, initial diagnosis, diagnostics	4.315	4
C4	Treatment planning and education	4.071	6
C5	Pain management	3.650	9
C6	Periodontal procedures	3.361	10
C7	Specialty procedures	2.896	11
C8	Restorative procedures	2.717	12
C9	Orthodontic procedures	2.447	13

Figures 1, 2, and 3 in the following section represent the overall means for the five categories of responsibility in relation to the respondents' demographic characteristics: province, practice setting, and educational qualifications. The columns appear in descending order: Education, Administration, Health Promotion, and Research. These four categories are followed by the first three Clinical Therapy subcategories which have the second, third and fourth highest columns, which corresponds with the rankings in

Table 5. The remaining six subcategories are the 6th, 9th, 10th, 11th, 12th, and 13th highest columns in the figures.

Analysis of Variance Concerning Demographic Factors

The research question regarding the demographic factors was the following:

7. How do selected demographic factors affect the dental hygienists' responses in each of the five categories of responsibility?

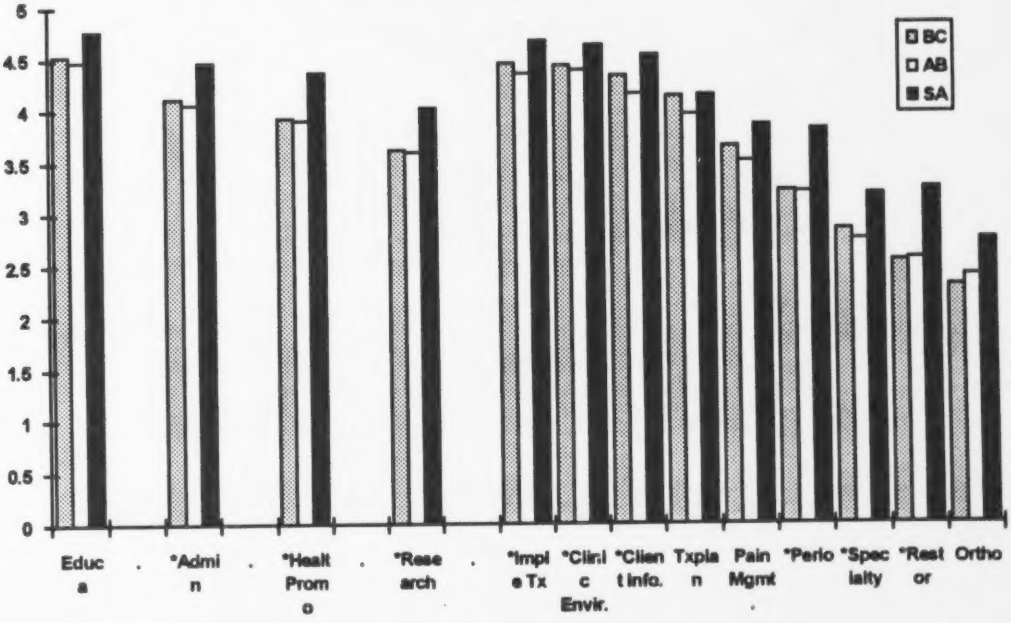
An analysis of variance was calculated for each of the categories to assess the statistical significance of the responses according to the respondents' demographic characteristics: province, year of graduation, practice setting, and educational qualifications. The means of each category are depicted for each demographic characteristic except for year of graduation because no statistical significance was found for any of the categories. The categories that are statistically significant according to the demographic factors are denoted with an asterix. Figure 1 indicates the means of each category according to the province where the respondents practice; Figure 2 indicates the means of each category according to the respondents' practice setting; and Figure 3 indicates the means of each category according to the respondents' education level.

Following each figure is an explanation of the statistically significant competencies according to the demographic factor represented in the figure. Only the competencies which had a statistically significant F value were reported in the tables. The numbers that are **bold** indicate the significantly highest mean/s for that competency according to the specific demographic factor.

Province

Figure 1 demonstrates that Saskatchewan rates all of the categories of responsibility higher in importance than Alberta and British Columbia. The

Figure 1: Means of Categories According to Province



* Denotes significant differences among the provinces

categories that are statistically significant according to province are administration, health promotion, research, and the following clinical therapy subcategories: implement treatment, clinical environment, client information, periodontics, specialties, and restorative.

The analysis of variance according to province in Table 6, demonstrates that Saskatchewan respondents rated the competencies significantly higher than Alberta and/or British Columbia for 29% of the Education Competencies, 45% of the Administration competencies, 77% of the Health Promotion competencies, 17% of the Research competencies, and 38% of the Clinical Therapy competencies (100% in the Restorative subcategory). British Columbia had significantly higher ratings than Alberta for, one Administration competency (participate in decision making in the practice environment), one Health Promotion competency (maintain access to colleagues and other resources), and five of the Clinical Therapy competencies. Both Saskatchewan and British Columbia had statistically higher ratings than Alberta for the competencies concerning the administration of local anesthetic, the interpretation of dental radiographs, and the maintenance of sharp instruments.

Table 6: Means of the Statistically Significant Competencies According to Province as Determined Through an Analysis of Variance

Competencies	British Columbia	Alberta	Saskatchewan	F - Prob.
Education				
3.07E Facilitate Change	4.5870	4.5435	**4.8276**	.0638
3.08E Patient Access Aids	4.2609	4.5217	**4.8276**	.0013
3.13E Diet and Oral Health	4.5435	4.4348	**4.7931**	.0349
3.14E Planned Care	4.5000	4.3261	**4.7586**	.0122

Competencies	**British Columbia**	**Alberta**	**Saskatchewan**	**F - Prob.**
3.15E Interim Evaluation	4.2444	4.3261	**4.6897**	.0410
Administration				
4.01A Develop Office Policies	4.4130	4.3913	**4.8966**	.0147
4.04A Decision Making	**4.6739**	4.3478	**4.7931**	.0053
4.08A Change Deficiencies	4.0435	4.2391	**4.5517**	.0162
4.09A Employment Conditions	3.0843	3.8696	**4.3793**	.0137
4.10A Manage Client Info	3.6522	3.6222	**4.2069**	.0265
4.11A Recall Systems	3.6304	3.8913	**4.4138**	.0049
4.16A Liabilities of Profession	4.2391	4.0652	**4.6897**	.0016
4.17A Prevent Malpractice	4.1087	4.1522	**4.7241**	.0082
4.20A Share Info With HCP	3.9773	4.1087	**4.4828**	.0208
Health Promotion				
2.01H Access Colleagues	**4.3696**	4.0435	**4.5172**	.0130
2.02H Identify Elderly's Needs	4.3043	4.0435	**4.5862**	.0173
2.05H Community Profile	3.3696	3.5435	**4.0690**	.0184
2.06H Nutritional Needs	4.3478	4.0652	**4.5517**	.0149
2.07H Community Programs	3.5870	3.8261	**4.2069**	.0255
2.08H Target Populations	3.6957	3.8696	**4.2414**	.0362
2.09H Community Education	3.5217	3.7609	**4.2759**	.0048
Research				
5.02R Epidemiological Survey	3.4773	3.5435	**4.2414**	.0015
Clinical Therapy				
C1 - Implement Treatment				
1.49C Desensitize Teeth	4.4783	4.3043	**4.7931**	.0054
1.56C Pit & Fissure Sealants	3.8696	3.8444	**4.483**	.0193
1.57C Anticariogenic Agents	3.8000	4.0870	**4.4138**	.0162
1.62C Care for Prosthesis	4.000	3.8222	**4.5172**	.0059
C2 - Clinical Environment				
1.04C Personal Information	3.4130	3.2826	**3.9310**	.0182
1.16C Assess Risk Factors	4.3478	4.3913	**4.7586**	.0255
1.28C Wear Gloves ,Mask, etc	4.8043	4.9565	**5.000**	.0403

Competencies	**British Columbia**	**Alberta**	**Saskatchewan**	**F - Prob.**
1.32C Perform CPR	4.4348	4.4783	**4.7931**	.0406
1.39C Sharpen Instruments	4.8913	4.7391	**5.000**	.0044
C3 - Client Information				
1.01C Record Data	4.5870	4.4783	**4.8621**	.0313
1.07C Examine Periodontium	**4.8913**	4.6087	**4.8966**	.0209
1.08C Periodontal Charting	4.5435	4.5435	**4.8621**	.0351
1.10C Chart Caries & Restorations	3.5435	3.3913	**4.0690**	.0067
1.15C Assess Lifestyles	4.1522	4.1522	**4.5862**	.0204
1.20C Interpret Radiographs	4.3261	3.8913	**4.6207**	.0007
1.50C Systemic Fluoride	**4.5870**	4.1957	4.5862	.0495
C5 - Pain Management				
1.36C Admin Local Anesthesia	**4.2391**	3.5000	**4.4828**	.0001
C6 - Periodontal Procedures				
1.58C Place Perio Dressings	3.2391	3.3111	**3.8966**	.0252
1.60C Remove Sutures	3.1111	3.1957	**4.0000**	.0008
C7 - Specialty Procedures				
1.11C Test Pulp Vitality	**3.0217**	2.4565	2.9286	.0247
1.21C Take Study Casts	2.7391	3.1304	**3.4138**	.0134
1.22C Fabricate Mouth Guard	2.5435	2.7826	**3.3103**	.0127
1.23C Dental Photographs	2.9565	2.9130	**3.5862**	.0197
1.61C Apply Rubber Dam	2.4348	2.6444	**3.2069**	.0122
C8 - Restorative Procedures				
1.54C Finish Restorations	3.1522	2.9130	**3.7586**	.0155
1.55C Margination	3.9783	3.6667	**4.2759**	.0285
1.64C Use a Matrix and Wedge	2.2391	2.3333	**2.8276**	.0366
1.65C Temporary Restorations	2.7174	2.5778	**3.4138**	.0035
1.66C Plastic Restorations	2.0217	2.1333	**2.7931**	.0025
1.67C Liners and Bases	1.8000	2.1778	**2.8276**	.0000
1.68C Amalgam Restorations	1.8000	2.0889	**2.7931**	.0001
C9 - Orthodontic Procedures				
1.70C Separate Teeth	2.0889	2.1778	**2.6897**	.0325

Competencies	British Columbia	Alberta	Saskatchewan	F - Prob.
1.71C Fit Ortho Bands	2.0222	2.2000	**2.6207**	.0322
1.72C Cement Ortho Bands	1.9556	2.2000	**2.5862**	.0279
1.73C Bond Ortho Brackets	1.9778	2.1556	**2.5517**	.0414

Year of Graduation

There were only nine competencies whose means were statistically significant according to the year of graduation of the respondents, as indicated in Table 7. Graduates from 1974-1983 rated the following competencies higher than the graduates from 1984-1993: one Administration competency (participate in the hiring of personnel); one Health Promotion competency (develop a community profile); and five Clinical Therapy competencies (apply the principles of infection control, *apply chemotherapeutic agents*, apply knowledge of bleaching techniques, use anticariogenic agents, and monitor the client for adverse reactions). Graduates from 1964-1973 rated three Clinical Therapy competencies higher than graduates from 1984-1993 (fabricate mouth protectors, *apply chemotherapeutic agents*, and evaluate the need for further services for the client). The 1984-1993 graduates were also higher than the 1964-1973 graduates for the competency concerning the practice of infection control principles.

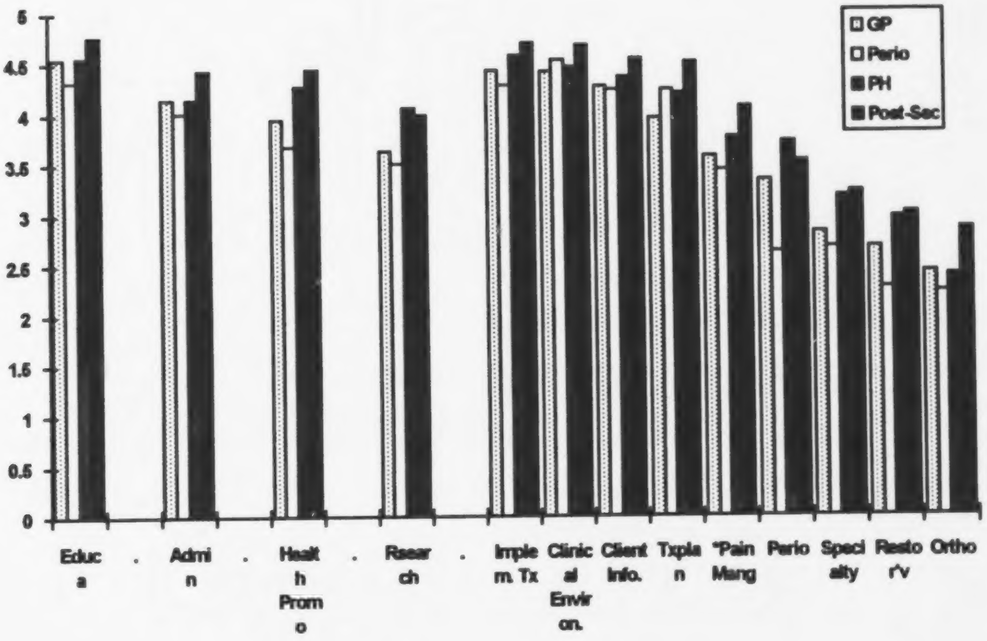
Table 7: Means of the Statistically Significant Competencies According to Year of Graduation as Determined Through an Analysis of Variance

Competencies	1964-1973	1974-1983	1984-1993	F Prob
Administration				
4.05A Participate in Hiring	3.0000	**3.5581**	3.1053	.0301
Health Promotion				
2.05H Community Profile	3.7500	**3.9767**	3.3684	.0156
Clinical Therapy				
C1 - Implement Treatment				
1.46C Chemotherapeutics	**4.8125**	4.6977	4.2407	.0008
1.57C Anticariogenic Agents	3.9123	**4.3721**	3.8000	.0218
C2 - Clinical Environment				
1.27C Infection Control	4.9375	**5.0000**	**5.0000**	.0425
1.82C Monitor Reactions	3.6875	**4.1900**	3.5439	.0185
C4 - Treatment Planning and Education				
1.86C Evaluate Needs	**4.6875**	4.4419	4.1053	.0499
C7 - Specialty Procedures				
1.22C Fabricate Mouth Guard	**3.3125**	3.0000	2.5789	.0298
1.48C Bleaching Techniques	3.5625	**3.5814**	3.0526	.0216

Practice Setting

Figure 2 demonstrates that the respondents who are educators in post-secondary institutions had a higher rating of importance for all the competencies except periodontics and research; and in the pain management sub-category educators were significantly higher than the respondents in general practice.

Figure 2: Means of Categories According to Practice Setting



* Denotes significant differences among the practice settings

There were thirteen competencies which were statistically significant according to the respondents' practice setting, as shown in Table 8. All of these were in the category of respondents who teach in post-secondary institutions. The `Community Health' setting and the `Post-Secondary' setting were significantly higher than the `General Practice' setting and the `Perio Specialty' setting for five competencies: fabricate mouth protectors; take dental photographs; apply knowledge of bleaching techniques; remove sutures; and one Research competency, conduct screenings and compile statistics.

Respondents in the `Community Health' settings had a significantly lower rating of importance for the competency referring to the wearing of rubber/latex gloves, safety glasses and a face mask than all the other practice settings. The `Perio Specialty' respondents had the lowest rating of importance for the competency concerning the application of knowledge of bleaching techniques.

The respondents from a `Post-Secondary' setting rated procedures which are often performed by other oral health professionals significantly higher than the respondents in a `General Practice' setting: determine, record and monitor vital signs; expose, process and mount cephalometric radiographs; perform electronic anesthesia; and place temporary restorations. `Post-Secondary' respondents were significantly higher in categories related to the recognition of clients in underserviced communities, the development of strategies to promote change, and the documentation and sharing of information with other health care professionals.

Table 8: Means of the Statistically Significant Competencies According to Practice Setting as Determined Through an Analysis of Variance

Competencies	General Practice	Perio Specialty	Community Health	Post-Secondary	F-Prob
Education					
3.07E Facilitate Change	4.6585	4.1429	4.3846	4.8125	.0133

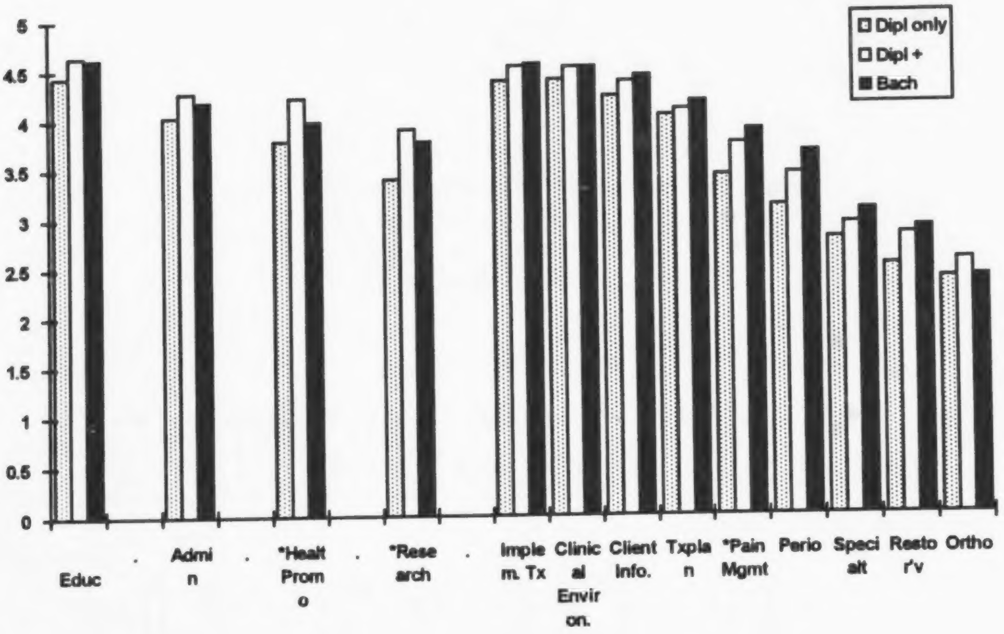
Competencies	General Practice	Perio Specialty	Community Health	Post-Secondary	F-Prob
Administration					
4.20A Collaborate with HCP's	4.0875	3.7143	4.0769	**4.6250**	.0308
Health Promotion					
2.04H Under-serviced Communities Needs	3.9512	3.7143	4.3077	**4.6250**	.0219
Research					
5.06R Compile Statistics	3.0854	2.8571	**3.1967**	**3.4375**	.0478
Clinical Therapy					
C1 - Implement Treatment					
1.57C Use Anticariogenic Agents	3.9753	3.4286	4.3846	**4.5000**	.0244
C2 - Clinical Environment					
1.04C Monitor Vital Signs	3.2683	4.1429	3.6154	**4.1875**	.0012
1.28C Wear Gloves/Mask/Glasses	**4.9390**	**5.0000**	4.5385	**5.0000**	.0013
1.29C Client's Safety Glasses	4.1481	4.0000	4.3077	**4.8750**	.0388
C5 - Pain Management					
1.53C Perform Electronic Anesthesia	2.8659	2.5714	3.3333	**3.7500**	.0204
C6 - Periodontal Procedures					
1.60C Remove Sutures	3.3210	2.4286	**3.7692**	3.6250	.0453
C 7 - Specialty Procedures					
1.19C Take Cephalometric Radiograph	2.4634	2.8571	3.0769	**3.3125**	.0135
1.22C Fabricate Mouth Guards	2.6951	1.8571	**3.2308**	**3.5000**	.0023
1.23C Take Dental Photographs	2.8780	3.0000	**3.7692**	**3.6875**	.0046
1.48C Know Bleaching Techniques	**3.3537**	2.0000	**3.3846**	**3.6250**	.0031
C8 - Restorative Procedures					
1.65C Place Temporary Restorations	2.6914	2.2857	3.1538	**3.5000**	.0187

Educational Qualifications

Figure 3 demonstrates that overall, the respondents with a `Diploma Only' rated the competencies lowest of all respondents. The respondents who have a

Bachelor Degree rate the competencies in the pain management subcategory significantly higher than the respondents with a `Diploma Only' or with a `Diploma + Other Education'. Respondents with a `Diploma + Other Education' were significantly higher than respondents with a `Diploma Only' in both the Health Promotion and Research categories.

Figure 3: Means of Categories According to Educational Qualifications



* Denotes significant differences among the education levels

The respondents in the `Diploma & Other Courses/Certificates' and the `Bachelor Degree' category rated the following competencies significantly higher than respondents with a `Diploma Only': one Research competency (understand how professional/scientific literature should be evaluated); and four Clinical

Therapy competencies (take dental photographs, perform electronic anesthesia, place and remove periodontal dressings, and place temporary restorations). The `Bachelor Degree' category was significantly higher than the `Diploma Only' category for two additional Clinical Therapy competencies: obtain personal information; determine, record and monitor vital signs (See Table 9).

The `Diploma + Other Courses/Certificates' rated the following competencies significantly higher than the `Diploma Only' category: one Education competency pertaining to nutrition counseling; two Administration competencies concerning the hiring of personnel and the obligations of the contractual relationship with the employer; three Health Promotion competencies which deal with the management of community oral health education; four Research competencies; and the Clinical Therapy competency concerning the administration of local anesthetic.

Table 9: Means of the Statistically Significant Competencies According to Educational Qualifications as Determined Through an Analysis of Variance

Competencies	Diploma Only	Diploma+ Courses / Certificates	Bachelor Degree	F-Prob
Education				
3.13E Educate About Diet and Health	4.3684	**4.6557**	**4.6667**	.0420
Administration				
4.05A Participate in Hiring	2.9211	**3.4590**	3.1905	.0202
4.13A Understand Contracts	4.0000	**4.3770**	4.4286	.0489
Health Promotion				
2.07H Conduct Community Education	3.5263	**4.0492**	3.7143	.0281
2.08H Understand Target Populations	3.5526	**4.1475**	3.7619	.0042
2.09H Manage Community Resources	3.4211	**4.0656**	3.7143	.0057

Competencies	Diploma Only	Diploma+ Courses / Certificates	Bachelor Degree	F-Prob
Research				
5.01R Maintain Professional Competence	4.2105	**4.6393**	4.3333	.0353
5.02R Perform Epidemiological Surveys	3.3684	**3.9500**	3.5000	.0093
5.03R Understand Literature Reviews	3.5526	**4.1967**	**4.1905**	.0018
5.04R Integrate Research & Practice	3.2162	**3.8095**	**3.8095**	.0482
Clinical Therapy				
C2 - Clinical Environment				
1.04C Determine, Monitor Vital Signs	3.2632	3.4754	**4.0000**	.0224
C3 - Client Information				
1.02C Obtain Personal Information	3.3158	3.6230	**3.9524**	.0213
C5 - Pain Management				
1.36C Administer Local Anesthesia	3.6316	**4.1803**	**4.1905**	.0396
1.53C Perform Electronic Anesthesia	2.5789	**3.1333**	**3.4762**	.0083
C6 - Periodontal Procedures				
1.58C Place/Remove Perio Dressings	3.0263	**3.5500**	**3.7619**	.0186
C7 - Specialty Procedures				
1.23C Take Dental Photographs	2.6842	**3.2295**	**3.3810**	.0215
C8 - Restorative Procedures				
1.65C Place Temporary Restorations	2.4211	**2.9333**	**3.2857**	.0087

Analysis of the Individual Competencies in the Five Categories of Responsibility

This section contains the analysis of the individual competencies in the five categories of responsibility: Means were used to determine their ratings of importance. The five categories are presented in order from highest to lowest overall means. Within each category, the individual competencies are also in descending order according to means. The qualitative responses were examined to identify competencies which should be revised, omitted or added to dental hygiene education programs in order for a graduating dental hygienist to be qualified to provide oral hygiene care. The qualitative responses are presented with the corresponding competencies.

Education

The research question for the Education category is the following:

3. Which education competencies identified in the survey should be included in a dental hygiene preparatory education program?

The Education category, which had the highest overall mean (4.569), includes competencies which involve the client's treatment plan. Through communication and collaboration with the client the dental hygienist develops the plan, determines the strategies and resources required to successfully complete the plan, and evaluates the outcomes. This includes an understanding of diet counseling, periodontal surgery and maintenance after surgery. All of the competencies in the Education category are considered of high to very high importance, as seen in Table 10.

There were no demographic characteristics which were statistically significant according to this category. The concern which is voiced in the comments is that the treatment plan and diagnosis must be a collaborative effort with the dentist, as a "team member". A British Columbia respondent believed that it is "illegal for us to diagnose and treatment plan - we can collaborate with the employer - making this (category) very high". While the overall rating is of high to very high importance, several respondents comment on the need for specialists to discuss their own treatment plans with the client. A Saskatchewan respondent felt that "its important that there is a good knowledge of the principles, indications and procedures of perio surgery, but I feel it is best that we let the specialist (periodontist) go into great depths with this". She/he also believed that diet counseling was "an important issue for hygienists to be competent in with lots of knowledge on the relationship - but as far as doing a total diet analysis on patients, I haven't done this since school". However, a British Columbia respondent commented that there are "some important changes re: diet suggestions happening now". There seems to be an overwhelming concern that there is not enough time to properly educate the clients in the "average dental office".

Table 10: Means and Standard Deviations of Competencies Pertaining to Education

Survey #	Education (Mean = 4.569)	Mean	SD
3.02E	use communication skills to encourage the client to participate during planning of oral health goals	4.77	0.46
3.01E	assess the client's oral health needs	4.74	0.56
3.03E	obtain informed consent	4.70	0.63
3.04E	discuss service priorities, options and alternatives with the client: determined following assessment	4.66	0.54
3.10E	document the client's treatment plan	4.67	0.52
3.17E	evaluate the need for further dental hygiene intervention	4.64	0.63

Survey #	Education (Mean = 4.569)	Mean	SD
3.06E	develop a dental hygiene diagnosis and treatment plan based on priorities/goals determined in consultation with the client	4.63	0.66
3.07E	determine strategies to facilitate change that promotes health/oral health	4.63	0.52
3.13E	educate clients regarding the relationship between diet and oral health	4.56	0.58
3.05E	assess barriers to the promotion of oral health (e.g. economics, attitudes, values and access)	4.53	0.69
3.12E	discuss the different phases of a periodontal treatment plan	4.54	0.70
3.08E	ensure that the client has access to educational resources and aids appropriate for his/her needs	4.49	0.66
3.14E	verify that the client has received the planned care	4.49	0.61
3.11E	discuss general principles, indications etc., for perio surgery and maintenance therapy	4.48	0.74
3.15E	facilitate the interim evaluation of the service provided with the client	4.39	0.77
3.09E	determine the methods for evaluating the outcomes/goals of services provided	4.38	0.76
3.16E	evaluate the client's response to the service provided (biological, behavioral, and social/psychological reactions)	4.35	0.77

Administration

The research question for the Administration category is the following:

4. Which administration competencies identified in the survey should be included in a dental hygiene preparatory education program?

The Administration category, which has the second highest overall mean (4.174), begins with general competencies concerning legislation, regulation and ethics. Then the competencies become more specific regarding participation and cooperation in decision making in the practice environment. Further skills include the development of a recall system and a business profile, and the performance of periodic documentation audits. Administration also encompasses the comparison of different practice settings and the assessment of occupational hazards.

The majority of the competencies in the Administration category rated from high to very high importance. There were no competencies which rated low. The competencies which rated moderate are listed in Table 11: 4.11A - manage a recall system (mean = 3.93); 4.10A - develop systems for management of client information (mean = 3.78); 4.18A - develop a business profile (mean = 3.66); 4.05A - participate in the hiring of personnel (mean = 3.26); and 4.06A - perform periodic documentation audits (mean = 3.24).

The province is the only demographic characteristic that is statistically significant. A Saskatchewan respondent thought that comments would change slightly if Saskatchewan was self-regulating: "If I was to go on my own I would have to be efficient in `all' areas". The understanding of the "pros and cons" of systems for the management of client information was important to an Alberta respondent, but she/he felt that "many systems exist; why develop more?".

One comment concerning the development of a business profile came from a British Columbia respondent who has a bachelor degree, who believed that " the DH and/or dentist should not discuss fees, payment options, etc., but that portion, that important portion of a dental visit, should be discussed with a member of the front end staff and a written treatment plan and options laid out for the client to make the final decision". The issue of participation in hiring of personnel rated the second lowest in the administration category (see Table 11). The comment from a Saskatchewan respondent regarding this competency was as follows: "If asked my opinion I would gladly try to help & give my opinion - but I strongly believe that the dentist in charge (owner of the practice) should be the one with the authority to do this - having one or more staff acting as "boss" & decision maker can cause problems within the staff - I think that the staff should know that there is only one boss!".

One area which an Alberta respondent from general practice felt was omitted from the Administration category was as follows: "No questions regarding time management, financial production and the importance of being accountable. Client health care is foremost but these other issues are reality of dental offices". These skills are addressed in the following competencies: 4.08A - identify deficiencies in the practice environment and promote change to correct them; 4.01A - develop office policies to ensure the dental hygienist is able to practice legally, ethically, and professionally; and 4.18A - develop a business profile.

Table 11: Means and Standard Deviations of Competencies Pertaining To Administration

Survey #	Administration (Mean: 4.174)	Mean	SD
4.12A	practice in accordance with relevant legislation and regulations	4.88	0.35

Survey #	Administration (Mean: 4.174)	Mean	SD
4.14A	practice in accordance with codes of ethics	4.88	0.33
4.04A	participate in decision making in the practice environment	4.58	0.63
4.01A	develop office policies to ensure the DH practices legally, ethically and professionally	4.52	0.80
4.03A	communicate the plan of care/programs to relevant health care team members	4.48	0.64
4.02A	consult with other members of the health care team in planning care/programs	4.44	0.71
4.19A	ensure management of the special needs patient (understand specialty treatment in order to discuss options with the client)	4.43	0.66
4.16A	describe the benefits and liabilities of being a professional	4.28	0.74
4.17A	discuss the significance of the practitioner/client relationship to the prevention of malpractice	4.28	0.92
4.13A	outline the obligations of the contractual relationship with the employer	4.27	0.80
4.08A	identify deficiencies in the practice environment and promote change to correct them	4.24	0.75
4.15A	understand portability and the scope of dental hygiene practice across Canada	4.22	0.81
4.20A	document the outcomes of client services and share the information with the appropriate health care professionals	4.15	0.79
4.07A	assess occupational hazards	4.03	0.95
4.09A	compare and appreciate employment conditions and philosophies of public health, private practice and specialty practices styles	3.98	0.89
4.11A	manage a recall system	3.93	1.03
4.10A	develop systems for management of client information	3.78	1.01
4.18A	develop a business profile (fee assessment and payment information; self employment)	3.66	1.00
4.05A	participate in the hiring of personnel	3.26	0.94
4.06A	perform periodic documentation audits	3.24	1.00

Health Promotion

The research question for the Health Promotion category is the following:

2. Which health promotion competencies identified in the survey should be included in a dental hygiene preparatory program?

The Health Promotion category, which has the third highest overall mean (4.021), examines the community to determine the health needs of the clients. This is achieved through consultation and collaboration with colleagues, other health care professionals, target population groups, and the clients. Another focus is on managing and conducting community health education programs. The final competency is the development of a community profile.

The majority of the competencies were rated from high to very-high in importance, as indicated in Table 12. The competency 2.08H -understand the rationale for selected target population groups had a mean of 3.90. The two competencies which referred to the development and management of oral health education programs had means rating from 3.80 to 3.83. The lowest mean was of 2.05H - develop a community profile (mean = 3.61).

Conflicting statements seem to account for the statistical significance among the practice settings in the Health Promotion category. Respondents who works in general practice made the following comments: "few jobs available in public health"; and "Health promotion skills must be higher when this is the main focus of the hygienist (i.e. employed in public health)". Respondents from community health settings wrote the following comments: "Health promotion is important because many people do eventually work in public health"; and "The health promotion portion of our job is key in using alternative practice settings as is our goal in BC". One Saskatchewan respondent who works at a post-secondary institution commented that health promotion skills had limited application: "Very important but not done by private practice hygienists because of rules on self-regulation - not many working in public health".

Two respondents who have their bachelor degree questioned the ability to develop this skill in a diploma program: "a recent graduating hygienist would not have the experience or skill in many areas especially community related areas"; and "The D.H. needs an awareness of 2.01H to 2.09H but competencies and proficiencies should be a past basic D.H. program. This questionnaire points up a great need for degree program".

Finally, there were two comments concerning the importance of the competency 2.05H - develop a community profile. The comments were from Alberta respondents, and both have a bachelor degree: "Developing a community profile is not as important as understanding one - there are many agencies that specialize in developing these. Why re-invent the wheel?"; and "Community profile is important to understand the client's points of view in health decisions".

Table 12: Means and Standard Deviations of Competencies Pertaining to Health Promotion

Survey #	Health Promotion (Mean = 4.021)	Mean	SD
2.06H	understand the nutritional needs throughout the life-cycle and special requirements for various oral conditions	4.29	0.73
2.01H	maintain access to colleagues and other resources who influence the quality of client services	4.28	0.72
2.02H	identify the needs of the elderly (social, medical, nutritional and pharmacological considerations)	4.27	0.81
2.03H	initiate and participate in client consultation and collaboration with other health professionals and care givers	4.17	0.88
2.04H	recognize the health needs of clients in under-serviced communities and the reasons for these needs	4.07	0.89
2.08H	understand the rationale for selected target population groups	3.90	0.90
2.07H	plan, conduct, and evaluate community oral health education programs	3.83	0.96
2.09H	manage community oral health education program resources	3.80	0.98
2.05H	develop a community profile	3.61	1.07

Research

The research question for the Research category is the following:

5. Which research competencies identified in the survey should be included in a dental hygiene preparatory education program?

The Research category begins with participation in activities and courses which will maintain professional competence: the overall mean is 3.707. Competence in research includes an understanding of the literature and of techniques for conducting epidemiological surveys. Research is integrated into the practice environment through identification of a problem and then compilation of statistics which were collected while conducting screenings.

Only the competencies related to maintaining professional competence through courses and literature were rated high to very high importance. The actual techniques of research and the integration of research into practice were rated of moderate importance. None of the competencies were rated low, as indicated in Table 13.

While the only statistically significant demographic characteristic was province, the comments in the Research category seemed to indicate that the responses were influenced by the respondent's practice setting. A British Columbia respondent who worked in community health remarked on the relevance of research in her/his practice setting: "Because I work in the hospital setting and do some research it may be a bit `biased' in that I really think we need to do more research even in a private practice setting!". Another community health hygienist (from British Columbia) was more concerned about the type of program which should incorporate research competencies: "I don't see these as highly important at the diploma level but a DH graduating with a degree should be competent in these areas". An Alberta dental hygienist who works with a periodontal specialist reiterated this idea, stating that "In a B.Sc., BDH program, the research aspect would have a much higher level of importance. Expectations would be different".

The two final competencies concerning the identification of a research question and the conducting of the research were marked low by a respondent who teaches in a post-secondary institution in Saskatchewan "because they are not generally used in general practice. Depends on importance where a person works". The comment from a British Columbia respondent who works in general practice was that "each test/survey is unique and it is good to have a basic knowledge but specific when needed".

Table 13: Means and Standard Deviations of Competencies Pertaining to Research

Survey #	Research (Mean: 3.707)	Mean	SD
5.01R	participate in activities and courses that contribute to the maintenance of professional competence	4.45	0.84
5.03R	understand how the professional / scientific literature should be evaluated	4.00	0.95
5.02R	discuss the techniques for conducting epidemiological surveys on oral health issues	3.70	0.95
5.04R	integrate research into the practice environment	3.55	1.04
5.05R	develop/identify a research question/problem	3.32	1.06
5.06R	conduct screenings and compile statistics for epidemiological purposes	3.19	1.06

Clinical Therapy

The research question for the Clinical Therapy competencies is the following:

1. Which clinical therapy competencies identified in the survey should be included in a dental hygiene preparatory education program?

All of the individual responses for each competency were added together and divided by the number of responses in order to obtain the overall mean for each Clinical Therapy category (3.606) and for each Clinical Therapy subcategory. The order of the Clinical Therapy subcategories was determined by sorting the means from highest to lowest.

Clinical Therapy 1: Implement Treatment

The first Clinical Therapy subcategory, `Implement Treatment', had the highest mean of the Clinical Therapy subcategories (4.467), as shown in Table 14. This subcategory includes the fundamental dental hygiene treatments: instrumentation; polishing; application of fluoride, chemotherapeutic agents, anticariogenic agents, and desensitizers; oral irrigation; proper care of implants and prosthesis; and placement of pit and fissure sealants. All of the means in this subcategory rated from high to very high importance. The first five competencies which rated very high importance were instrumentation, polishing and fluoride procedures which are historically the primary procedures for removing debris and protecting the tooth structure. The remaining seven competencies which rated high importance require newer techniques and technology: chemotherapeutics, desensitizers, dental implants, oral irrigation, anticariogenic agents, and pit and fissure sealants.

The first qualitative comment concerning the competencies in the `Implement Treatment' subcategory concerned polishing, application of chemotherapeutic agents, and the placement of pit and fissure sealants. Only the provincial descriptor of the respondents is recorded in the qualitative statements for this subcategory, because the other demographic characteristics did not demonstrate a significant influence on the responses. The British Columbia respondent stated that these competencies could be performed by a certified dental assistant. A Saskatchewan respondent's comment was that oral irrigation was not performed in the respondent's office. The only omission was concerning the competency 1.45C in Table 14, which the Saskatchewan respondent stated should be changed to "perform *selective* polishing".

Table 14: Means and Standard Deviations of Competencies Pertaining to the Implementation of Treatment

Survey #	Implement Treatment (Mean: 4.467)	Mean	SD
1.43C	perform mechanical debridement by hand instrumentation	4.85	0.51
1.44C	perform mechanical debridement by sonic/ultrasonic instrumentation	4.83	0.37
1.38C	practice appropriate adaptation of instruments	4.82	0.46
1.45C	perform appropriate polishing techniques	4.63	0.61
1.51C	assess the need for and provide topical fluoride	4.64	.061
1.46C	apply appropriate chemotherapeutic agents	4.51	0.71
1.49C	desensitize teeth	4.48	0.65
1.63C	implement appropriate care of dental implants	4.41	0.84
1.47C	perform oral irrigation	4.28	0.80
1.62C	care for fixed and removable prosthesis	4.07	0.95
1.57C	use anticariogenic agents	4.06	0.93

Survey #	Implement Treatment (Mean: 4.467)	Mean	SD
1.56C	place pit and fissure sealants	4.00	1.00

Clinical Therapy 2: Safety and Preparation of the Clinical Environment

The second Clinical Therapy subcategory, the Safety and Preparation of the Clinical Environment, had an overall mean of 4.459. This subcategory includes competencies that are required to maintain a safe and effective environment for the client and the dental team. The dental hygienist must maintain the operatory, equipment and instruments to allow effective treatment in an infection free environment. The clients must be monitored to determine the possibility of risk, and there must be provisions for emergency care.

The first thirteen competencies in this subcategory rated from high to very high importance, as indicated in Table 15. The two remaining competencies had means in the moderate range: 1.82C - monitor the client for adverse reactions to interventions had a mean of 3.78; 1.04C - determine, record and monitor vital signs had a mean of 3.48.

The provincial location of the respondents was the only demographic characteristic that was statistically significant in the analysis of variance for this subcategory. The comments concerning the monitoring of vital signs suggested several reasons for the moderate rating. The comments from Saskatchewan and British Columbia respondents were that either "It should be the dentist's responsibility to determine vital signs" or "dental offices usually don't perform this service - but should - time factor probably". An Alberta respondent comment stated that "Vital signs, e.g. BP, are not recorded at each appointment for every person - judgment & discretion are used". Another Alberta respondent stated "I do not feel I have enough up to date info for a thorough exam but it's importance is still high (particularly head & neck)".

A Saskatchewan respondent shifted the primary responsibility of emergency control to the dentist: "I feel this is important to be "up" on & to keep up on first aid and CPR but I also feel that the `Dr.' who is more qualified should be in control of this area".

Several comments were made concerning the protection of the client's eyes with safety glasses. The comment from a British Columbia respondent was that "Clients usually prefer not to wear safety glasses"; and the Alberta respondent stated that "Many people wear glasses and if they don't I simply tell them to close their eyes". However, another Alberta respondent felt that "There is not nearly enough emphasis on eye protection for clients".

Table 15: Means and Standard Deviations of Competencies Pertaining to the Safety and Preparation of the Clinical Environment

Survey #	Clinical Environment: Safety and Preparation (Mean:4.459)	Mean	SD
1.27C	practice principles of infection control	4.99	0.09
1.28C	wear rubber/latex gloves, safety glasses and a face mask	4.91	0.37
1.39C	maintain instruments so that they are sharp and have an appropriate shape	4.86	0.35

Survey #	Clinical Environment: Safety and Preparation (Mean:4.459)	Mean	SD
1.26C	recognize signs and symptoms of medical emergencies in the dental office	4.79	0.46
1.31C	provide emergency care (e.g. activate 911)	4.69	0.64
1.33C	use scientifically recognized clinical techniques in performing procedures	4.60	0.62
1.34C	select suitable equipment and resources for the services being provided	4.55	0.59
1.32C	maintain current certification in cardio-pulmonary resuscitation and basic first aid	4.53	0.62
1.16C	assess risk factors/markers for caries, periodontal disease, and other pathologies	4.46	0.68
1.30C	understand the impact of pharmacological actions / interactions and oral manifestations of medications	4.37	0.74
1.29C	protect the client's eyes with safety glasses	4.26	0.95
1.42C	maintain operatory, equipment and instruments, according to manufacturers specifications	4.27	0.82
1.41C	maintain and isolate operating field to reduce cross-contamination	4.22	1.12
1.82C	monitor the client for adverse reactions to interventions	3.78	1.15
1.04C	determine, record and monitor vital signs	3.48	1.00

Clinical Therapy 3: Obtain Client Information, Initial Diagnosis, Diagnostics

The third Clinical Therapy subcategory had an overall mean of 4.315: included are the competencies which involve obtaining client information and utilizing diagnostic tools in order to make an assessment of the client's oral health care needs. This includes obtaining and recording personal, medical and dental information via written information, verbal communication, extraoral and intraoral examinations, and radiographs. The first 13 competencies in this subcategory rated from high to very high in importance, as indicated in Table 16.

The four competencies which rated below the high to very high importance were the following: 1.18C - expose, process and mount panoramic radiographs (mean = 3.88); 1.10C - perform comprehensive caries and restorative charting (mean = 3.57); 1.02C - obtain personal information (e.g. cultural and socioeconomic factors) (mean = 3.58); and 1.12C - examine occlusion (mean = 3.30)

The demographic characteristic that was statistically significant was province. Comments regarding panoramic radiographs expressed a concern about the difficulty in reviewing the wide variety of panoramic machines. The British Columbia respondent's suggestion was that a general knowledge of the process was necessary but specific utilization of the panoramic machine should occur in practice after graduation. In regards to the interpretation of radiographs, while it was rated high, one respondent thought it was illegal in British Columbia, and an Alberta respondent specified that interpretation should only be done "to facilitate the clinical aspect of dental hygiene".

There was some confusion concerning the reason for examining the occlusion which could account for the moderate rating. One Saskatchewan respondent asked if an examination of the occlusion was for "orthodontic purposes or following a sealant placement".

There were two comments made on competencies that rated high-very high. One Alberta respondent in reference to periodontal charting stated that "Specific charting is only done on periodontally involved clients; this must be balanced with time restraints". A British Columbia respondent's comment in response to the examination of the head, neck, and intra-oral soft tissues was that "Examine intraoral soft tissues only for identified concerns: not head and neck. The dentist does this, but it is vital that the hygienist should know how to do it".

Table 16: Means and Standard Deviations of Competencies Pertaining to Obtaining Client Information, Initial Assessment of the Client, and Diagnostics

Survey #	Obtain Client Information , Initial Assessment , Diagnostics (Mean: 4.315)	Mean	SD
1.03C	obtain medical history	4.85	0.35
1.05C	records the necessity for special precautions (contra-indications for treatment)	4.82	0.41
1.07C	examine the periodontium	4.78	0.56
1.13C	assess the hard and soft deposits	4.74	0.48
1.08C	perform periodontal charting	4.70	0.56
1.01C	record clinical data, clinic and education processes and outcomes, accurately and permanently	4.61	0.61
1.09C	perform a visual examination of the dentition	4.45	0.73
1.50C	assess the need for systemic fluoride	4.43	0.86
1.14C	assess client's oral self-care using indices and other assessment methods	4.43	0.72
1.17C	expose, process and mount intra-oral radiographs	4.33	0.86

Survey #	Obtain Client Information , Initial Assessment , Diagnostics (Mean: 4.315)	Mean	SD
1.06C	examine head, neck, and intraoral soft tissues	4.32	0.81
1.84C	record treatment record (overall treatment plan, treatment, counseling etc.)	4.29	1.00
1.15C	assess lifestyles related to general and oral health (eg.smoking)	4.25	0.73
1.20C	interpret dental radiographs	4.24	0.85
1.18C	expose, process and mount panoramic radiographs	3.88	1.02
1.10C	perform comprehensive caries and restorative charting	3.57	0.94
1.02C	obtain personal information (e.g. cultural and socioeconomic factors)	3.58	0.85
1.12C	examine occlusion	3.30	0.96

Clinical Therapy 4: Treatment Planning and Education

The competencies in Clinical therapy subcategory 4 involve the development and evaluation of the treatment plan in conjunction with the client: the overall mean is 4.071 (see Table 17). There were no statistical significance values drawn from the independent variables. The first three competencies regarding the development, assessment of the effectiveness of the treatment and evaluation of future patient needs are rated high to very high importance, as indicated in Table 17. The only competency which rated moderate was 1.81C - provide instruction in placement and care of removable orthodontic appliances (mean = 3.08). The comments concerning this subcategory stated that treatment planning should relate to dental hygiene only or more specifically to "perio only". Further examination of client education is discussed in the `Education" category.

Table 17: Means and Standard Deviations of Competencies Pertaining to Treatment Planning and Education

Survey #	Treatment Planning and Education (Mean: 4.071)	Mean	SD
1.87C	provide appropriate instructions for post-treatment	4.43	0.90
1.86C	evaluate the need for further services for the client	4.40	0.96
1.85C	assess the effectiveness of the treatment plan and facilitate revisions based on the evaluation	4.26	1.07
1.83C	develop the treatment plan in conjunction with the client or their care-giver	4.19	1.03
1.81C	provide instruction in placement and care of removable orthodontic appliances	3.08	1.19

Clinical Therapy 5: Pain Management

This Clinical Therapy subcategory contains the competencies which are related to the management of the client's anxiety and discomfort: the overall mean is 3.650, as seen in Table 18. The competencies include the application of administration of topical, local and electronic anesthesia, as well as nitrous oxide. The respondents rated the management of anxiety, the application of topical anesthetic and the administration of local anesthetic as high to very high. Electronic anesthesia was rated moderate (mean = 3.02), as indicated in Table 18. However, the administration of nitrous oxide and oxygen conscious sedation was rated low (mean = 2.37).

The demographic characteristics which were statistically significant in this subcategory were education and practice setting. The respondents who commented on electronic anesthesia stated one of two experiences: the

Saskatchewan respondent (Post-Secondary employment & Bachelor Degree) had "Used electronic anesthesia in office but wasn't impressed by it"; and the British Columbia respondent (Perio Specialty & Dipl +) had "never performed electronic anesthesia". The comments concerning nitrous oxide administration were from Alberta (Perio Specialty & Dipl+) and Saskatchewan (GP & Bachelor Degree) and they stress that due to the risk factors this procedure should only be performed by a dentist or a doctor.

There was an overwhelming response concerning the administration of local anesthetic. Alberta respondents made numerous comments: "I think it's time to move Hygiene in Alberta to the 90's. Anesthetic is a must!"; "Local anesthetic should be legalized for DH's in Alberta"; and "Local anesthetic is a MUST for hygienists to have!! We need to provide training for this so that hygienists can become more independent (no more waiting 1/2 hour -3/4 hour to get a dentist to administer LA)". One Ontario graduate stated that she/he does "use local on patients for perio scaling (on certain pt's) - and having to get a dentist & wait to administer local can mess up everyone's schedule - using local allows the hygienists to do a more thorough perio scaling job with less pt discomfort". Respondents who are allowed to administer local anesthetic find the treatment for patients to be "more continuous and time effective being able to do it myself".

Table 18: Means and Standard Deviations of Competencies Pertaining to Pain Management

Survey #	Pain Management (Mean: 3.650)	Mean	SD
1.35C	manage client's anxiety/discomfort during the provision of clinical services	4.67	0.49
1.52C	apply topical anesthetic	4.17	0.97
1.36C	administer local anesthetic	4.01	1.09
1.53C	perform electronic anesthesia	3.02	1.17
1.37C	administer nitrous oxide and oxygen conscious sedation	2.37	1.04

Clinical Therapy 6: Periodontal Procedures

The Clinical Therapy subcategory on Periodontal Procedures contains only three competencies and they are all have a rating of moderate importance, as indicated in Table 19: the overall mean was 3.361.The statistically significant demographic characteristic was province. There was one comment from British Columbia for the first competency, 1.58C - place and remove periodontal dressings (mean = 3.43): "Personally, I have not performed this duty, but in a perio specialty practice & some general practices it may be helpful". There were no comments concerning 1.60C - the removal of sutures (mean = 3.36). However, there were numerous comments concerning 1.59C - performing gingival curettage (mean = 3.32). Two respondents stated that it was illegal in British Columbia. The comments from Saskatchewan respondent's were that the "Importance of gingival curettage is being questioned", and "there are procedures done by a periodontist that are more successful than gingival curettage".

Table 19: Means and Standard Deviations of Competencies Pertaining to Periodontal Procedures

Survey #	Periodontal Procedures (Mean: 3.361)	Mean	SD
1.58C	place and remove periodontal dressings	3.43	1.10
1.60C	remove sutures	3.36	1.08
1.59C	perform gingival curettage	3.32	1.22

Clinical Therapy 7: Specialty Procedures

This Clinical Therapy subcategory contains a collection of specialty procedures, as indicated in Table 20: the overall mean was 2.896. The competencies which rated moderate importance include: 1.24C - take oral diagnostic tests(mean = 3.7); 1.48C - apply knowledge of bleaching techniques (mean = 3.31); 1.23C - take dental photographs (mean = 3.10); and 1.11C - fabricate study casts (mean = 3.06). There were no statistically significant demographic characteristics for this subcategory. The Saskatchewan respondents comments concerning oral diagnostic tests were that it "Tis a dream!", and that it "Will become more important as time goes on". The Alberta respondent's comment concerning study casts was: "that in a 1 hour appointment there is not time to take study casts if required. It is more financially feasible to have assistants take these at another scheduled appointment; same with mouth protectors and dental photos". Bleaching techniques were considered to be controversial by several Saskatchewan respondents: "I think we need more long-term studies of bleaching techniques before we do much of this - the long term effects have not been established yet".

The remaining competencies rated low importance. The competency concerning assembling and transferring instruments during assisting procedures had a mean = 2.80. The low rating may be because this competency is seen as a dental assistant's duty and it is rarely performed by a dental hygienist. The Alberta respondent's comment concerning 1.22C - fabrication of mouth protectors (mean = 2.84) was: -"I have personally never had to perform this task. However, I could see the rationale behind this if the D.H. was working in a remote area and no other Dental (i.e. Dental Mechanic, Dentist etc.) could provide this or when we take over all `Preventive' tasks". The Saskatchewan respondent who commented on 1.11C - test pulp vitality noted that the dentist does this procedure in their office.

The only comment concerning 1.19C - cephalometric radiographs (mean = 2.08) and 1.80C - cephalometric tracings (mean = 2.08) was from Saskatchewan: "I haven't performed this since graduation once". Again, these radiographs are used for a specialized dental diagnosis and would never be taken routinely. They are specific and costly and usually performed in one location by a dental assistant or a radiologist. A dental hygienist would rarely take cephalometric radiographs.

Table 20: Means and Standard Deviations of Competencies Pertaining to Specialty Procedures

Survey #	Specialty Procedures (Mean: 2.896)	Mean	SD
1.24C	take oral diagnostic tests (e.g. bacterial content within sulcus; salivary pH; oral cancer detection)	3.67	1.02
1.48C	apply knowledge of bleaching techniques	3.31	1.03
1.23C	take dental photographs	3.10	1.11
1.21C	fabricate study casts (take and pour impressions)	3.06	1.01
1.22C	fabricate mouth protectors	2.83	1.12
1.40C	assemble and transfer instruments during assisting procedure	2.80	1.10
1.11C	test pulp vitality	2.78	1.07
1.61C	apply and remove rubber dam	2.71	1.12
1.19C	expose, process and mount cephalometric radiographs	2.65	1.10
1.80C	perform cephalometric tracings	2.08	0.95

Clinical Therapy 8: Restorative Procedures

The Clinical Therapy subcategory on Restorative Procedures, which has an overall mean of 2.717, begins with the removal of overhangs, and the recontouring and finishing of restorations. The remaining competencies involve the actual placement of cavity liners and bases, as well as temporary, plastic and amalgam restorations.

The only competency which rated near high was the removal of overhangs (mean = 3.92), which is a procedure that is performed in a general practice setting. The competency concerning recontouring and finishing restorations rated moderate (mean = 3.19). However, all the remaining competencies rated low and the lowest was 1.68C - place amalgam restorations (mean = 2.16).

Table 21 indicates the overall mean for Restorative Procedures equals 2.717. The statistically significant demographic characteristic was the province. The comment from a British Columbian concerning restorative competencies indicate that these procedures are "not often (unfortunately) utilized in general practice but competency should be very high when these skills are being used". One Alberta respondent stated that dental hygienists could expand our skills to include restorative procedures: "I think it would be wonderful if our skill were broadened - especially in this day of cut backs it gives hygienists a few more options and makes us more important to the dentists".

Several respondents are qualified dental therapists in Saskatchewan and are legally qualified to practice restorative procedures:

> As a licensed Dental Therapist my practice day includes a large amount of restorative techniques. They rank VH for me but for a hygienist in

> provinces that don't permit restorative or in many other hygiene settings they might be deemed to be ranked VL.

British Columbian respondents stated that restorative procedures were illegal in their province.

The comments concerning the removal of overhangs were consistently stating that this was the dentist's responsibility: a British Columbia respondent commented that the procedure was "To be done by a dentist because it's much less time consuming using a drill/bur etc. than margination"; a Saskatchewan respondent commented that "This should be dentist' responsibility as they cause these"; a Saskatchewan respondent commented that "I feel that the dentist should be responsible for this - unless the dentist is unreasonable even after discussing the problem - then we as hygienists should proceed. How do you explain to pt's why their filling end up fracturing or falling out every time you try to remove overhangs".

Additional comments concerning reasons for not being involved in restorative procedures are the following: a Saskatchewan respondent stated that "Scaling & root planing generate $$"; a British Columbia respondent preferred that "RDH remain as a preventive practitioner but may be necessary to expand into ortho & restorative for employability purposes".

Table 21: Means and Standard Deviations of Competencies Pertaining to Restorative Procedures

Survey #	Restorative Procedures (Mean: 2.717)	Mean	SD
1.55C	remove overhangs on restorations (margination)	3.92	0.96
1.54C	recontour and finish restorations	3.19	1.26
1.65C	place temporary restorations	2.83	1.12
1.64C	assist in restorative procedures by applying and removing the matrix and wedge	2.43	1.01
1.66C	place, carve, and finish plastic restorations	2.26	1.01
1.67C	place cavity liners and bases	2.2	1.00
1.68C	place amalgam restorations	2.16	1.01

Clinical Therapy 9: Orthodontic Procedures

The final Clinical Therapy subcategory groups together all the orthodontic procedures. The overall mean is 2.447, as indicated in Table 22 which is the lowest rating of importance for all the competencies performed by a graduating dental hygienist. There are two competencies in this subcategory that had a moderate rating of importance: 1.76C - remove excess cement following cementation of orthodontic bands (mean = 3.20); and 1.79C - classify occlusion and identify deviant swallowing patterns (mean = 3.14). The remaining competencies include the fabrication of mouth protectors, the preparation and recording of occlusal records, and the performance of specific orthodontic services.

This subcategory had the largest number of comments. There was no statistical significance according to province, year of graduation, education or practice setting. The overwhelming comment was that there should be a separate module for orthodontics or the dental hygienist should be trained by the orthodontist. One Alberta respondent, who has a bachelor degree, stated the following:

> I believe graduating hygienists should have some exposure to restorative and orthodontic techniques. However, in practical terms I believe most dentists would rather have these duties performed by dental assistants rather than hygienists mainly for financial considerations. Further training in ortho can be achieved in an ortho practice.

A Saskatchewan respondent made a similar statement:

> Although I feel that the more procedures one is competent in, the better for the individual, the public & the profession, and that an expanded field of duties is certainly desirable, I'm not sure that the small number of hygienists that would actually directly benefit by being employed in a situation where they could apply this knowledge, would in fact warrant training all grad. hygienists to be highly competent in all orthodontic procedures. Orthodontists seem more than willing to provide their employees with training modules necessary to upgrade their skills.

An Alberta respondent noted the benefit of removing space maintainers but not of performing all orthodontic procedures: "Knowledge of inserting and removing space maintainers necessary to give complete hygiene appointments only; other ortho knowledge should be a separate specialty". There are several British Columbia respondents who believed that an orthodontic module would be "too much for a regular DH program".

A Saskatchewan respondent felt that certified dental assistants were employed by orthodontists for these procedures and therefore, it is unnecessary for dental hygienists to be proficient in this area. Another Saskatchewan respondent reiterated the previous statement and added that "if a person isn't involved in doing these procedures on a regular basis, the knowledge fades and the competency would be low". Therefore, the consensus was to have a separate orthodontic module after graduation for those interested dental hygienists.

Table 22: Means and Standard Deviations of Competencies Pertaining to Orthodontic Procedures

Survey #	Orthodontic Procedures (Mean: 2.447)	Mean	SD
1.76C	remove excess cement following cementation of orthodontic bands	3.20	1.16
1.79C	classify occlusion and identify deviant swallowing patterns	3.14	1.13
1.78C	prepare and record preliminary occlusal records	2.54	1.17
1.69C	perform orthodontic services	2.29	1.00
1.70C	separate teeth prior to banding	2.28	1.02

Survey #	Orthodontic Procedures (Mean: 2.447)	Mean	SD
1.77C	fit space maintainers	2.28	1.07
1.74C	place and remove orthodontic arch wires	2.27	0.97
1.75C	remove orthodontic bands and brackets	2.27	1.02
1.71C	fit orthodontic bands prior to cementation	2.25	0.98
1.72C	cement orthodontic bands	2.21	1.00
1.73C	bond orthodontic bands	2.19	0.97

A respondent from British Columbia who had a `Diploma + Other Education' and who worked in a periodontal specialty practice, made a comment concerning an omitted area of concern beyond the restorative and orthodontic subcategories of clinical therapy:

> These skills can be learned at continuing education courses later when the BDH has a grasp of how they can affect the periodontium or her job in maintaining the oral health of a patient. More time should be spent on oral CA, head & neck pathology, occlusion & TMJ & radiology - interpretation of bone morphology etc..

However, these competencies are actually stated in earlier competencies: 1.24C - oral diagnostic tests; 1.06C - head, neck and intraoral examination; 1.12C - examine occlusion; 1.19C - take cephalometric radiographs; 1.80C - perform cephalometric tracings; and 1.20C - interpret radiographs.

General Comments Concerning the Five Categories of Responsibility

There were many respondents who felt that all the competencies were very important depending on the practice setting; they were especially interested in a comparison between private practice to community health. The reasons for marking very low for certain competencies was that these procedures were not done in their practice. An overwhelming concern of Alberta graduates was that "It would certainly be difficult to include all of the competencies in a two-year program such as now offered at the U of A!". Two British Columbia graduates who work in community health held the same concern: "Generally, there is too much material taught in the dental hygiene course now, either lengthen course or provide the most important material"; and "I struggled as I answered the questions re. at what level the DH would be graduating i.e. diploma, degree, graduate studies. When I look at my answers I think it would be impossible for an individual to be highly competent in all these areas after a 2 year diploma program". The dilemma for the respondents seemed to be that they thought all the competencies were important but they would not all fit in a two year diploma program. Therefore, the respondents prioritized the rating of importance of the competencies in accordance with what they thought should be included in a diploma program for dental hygienists.

Chapter Summary

In this chapter the questionnaire data were presented, analyzed and discussed. The competencies for graduating hygienists were organized into five categories, and each category was ordered according to their means, from highest to lowest importance. The comments on the questionnaire were included in the corresponding category. Each of the competencies were analyzed in relation to province, educational qualifications, year of graduation and practice setting, in order to determine the influence of these demographic factors on the responses.

Overall, Saskatchewan respondents rated the competencies higher than the respondents from the other two provinces. The majority of the Saskatchewan respondents were in the `Diploma + Other Courses/Certificate' education category and Saskatchewan had the highest number of respondents in the `Post-Secondary' practice setting: these two demographic factors also had higher importance ratings.

The competencies in the Education category were rated high to very high importance. Again, competency in specialty areas such as periodontics and diet counseling were deemed to be beyond the scope of the graduating dental hygienist, but knowledge of the principles was considered to be very important. Team work was another important issue in the areas of diagnosis and treatment planning. This would require an coordinated effort with the dentistry and dental hygiene students in an educational institution to ensure that they have an opportunity to develop a philosophy of collaboration.

In the Administration category it is evident that the respondents consider the competencies concerning legal, ethical and professional practice to be of very high importance. However, competencies which require the development of client management systems, business profiles, or documentation audits had ratings of moderate importance. This appears to be the dentist's domain, along with the hiring of personnel. One omission was noted and it concerned the lack of emphasis on time management, financial production and accountability.

While the overall rating of importance for the Health Promotion category was high, the competencies which related to the management of community oral health were moderate. This was accounted for in the comments because the respondents from the community health settings could see the benefits of these competencies while the respondents from general practice settings believed that these competencies had limited applicability. This prompted comments that dental hygiene should be a Bachelor Degree to accommodate all the competencies.

The Research category has moderate ratings of importance for the majority of the competencies. While the respondents believed that they should participate in activities and courses that contribute to the maintenance of their professional competence, and that they should understand the scientific literature, they did not believe that dental hygienists needed to be competent in contributing to that body of knowledge. Respondents felt that emphasis on the area of research would be beyond a diploma program and should be emphasized in a bachelor of dental hygiene program or in continuing education courses for practitioners in a community health practice setting.

Clinical Therapy was the largest category and was therefore divided into nine subcategories. The first three subcategories related to the implementation of the traditional dental hygiene procedures, the safety and preparation of the clinical environment, and the competencies involved with the collection of client information and the initial diagnosis. The overall ratings were high to very high importance. However, the comments on the competencies with lower ratings suggested that these procedures could be performed by a certified dental assistant (e.g. pit and fissure sealants; panoramic radiographs), or the respondent did not perform the procedure in his/her practice (e.g. oral irrigation; safety glasses for clients), or the procedure should be performed by a dentist (e.g. determining vital signs; monitoring the client for adverse reactions; comprehensive charting). Therefore, these competencies would require less emphasis in a diploma program.

The competencies in the Clinical Therapy subcategory pertaining to Treatment Planning and Education rated high which corresponded with the Education category which also rated high. The Pain Management subcategory reflected the passionate pleas from Alberta respondents for local anesthetic which had a high rating, and the limited availability of the electronic anesthetic which had a moderate rating of importance. The lowest rating was the administration of nitrous oxide sedation because of the risk factors.

Periodontal procedures had moderate ratings of importance for the graduating dental hygienist because these procedures seem to be limited to the periodontal specialists. The Specialty Procedures rated from moderate to low importance. Bleaching techniques were considered to be controversial, and the other competencies were rarely performed by the respondents because they are the responsibility of other oral health professionals: the fabrication of study casts or mouth protectors; taking dental photographs; testing pulp vitality; applying and removing rubber dams; and taking cephalometric radiographs. Graduating dental hygienists need an understanding of these procedures but not necessarily be able to demonstrate competency in these skills.

The competencies in the Restorative Procedures subcategory were rated low in importance. However, Saskatchewan respondents rated this subcategory higher than Alberta and British Columbia respondents. Saskatchewan had a greater number of dental hygienists who have a dental therapist certificate which entitles them to legally perform restorative procedures.

The Clinical Therapy subcategory on Orthodontic Procedures rated the lowest of all the competencies in the questionnaire. There was an overwhelming consensus that these competencies should be provided in a separate module after graduation. Respondents did give a moderate rating of importance to the removal of excess cementation of orthodontic bands. This skill is actually a continuation of the scaling procedure which rated very high in the Implement Treatment subcategory.

CHAPTER 5

SUMMARY, DISCUSSIONS & RECOMMENDATIONS

In the first section of this chapter a summary of the study is provided. In the second section, a discussion of the highlights and implications of the study are presented. In the final section recommendations for dental hygiene programs and for future research will be presented.

Summary of the Study

The CDHA has identified five areas of professional responsibility: clinical therapy, health promotion, education, administration and research. The purpose of this study was to identify the competencies in the five areas that are required for a graduating dental hygienist to be qualified to provide oral care. The responses of the dental hygienists could contribute to the definition of their profession's education standards.

The study sought to answer the following research questions:

1. Which clinical therapy competencies identified in the survey should be included in a dental hygiene preparatory education program?
2. Which health promotion competencies identified in the survey should be included in a dental hygiene preparatory education program?
3. Which education competencies identified in the survey should be included in a dental hygiene preparatory education program?

4. Which administration competencies identified in the survey should be included in a dental hygiene preparatory education program?

5. Which research competencies identified in the survey should be included in a dental hygiene preparatory education program?

6. Which preparatory level competencies occur in practice but are not identified in the survey?

7. How do selected demographic factors affect the dental hygienists' responses in each of the five categories of responsibility?

The survey instrument for this study was developed by examining the following sources: the Health and Welfare document, The Practice of Dental Hygiene in Canada (1988); the Education Standards Workshop Report (1994); the Provincial Review of National Dental Hygiene Examination Competencies (1995); and the University of Alberta's Dental Hygiene Curriculum Guide (1994). Both quantitative and qualitative data were obtained from the survey. The survey was distributed to a random sample of 240 registered dental hygienists from Western Canada: British Columbia, Alberta, and Saskatchewan. The dental hygienists had to fulfil the practice requirement of a minimum of 50 days clinical practice or teaching over the last three years. There was a fifty-five percent completed survey response rate: five percent of the respondents did not satisfy the practice requirement.

According to Health and Welfare Canada (1988), 82% of dental hygienists practice in private dental practice; 10% are from community health settings; and post-secondary educational institutions account for more than five per cent of dental hygienists. In this study 67% were from private practice; 12% were from community health; and 13% worked at post-secondary institutions. Since this study had a higher representation in the community health and post-secondary educators categories, and both of these categories rated higher than private practice for ten competencies, the ratings for these competencies may be too high when considering the entire Canadian dental hygiene population.

Means and standard deviations were calculated for each competency. An analysis of variance was used to calculate the F value of the competencies in order to determine statistical significance of the responses according to four independent variables: province, practice setting, educational qualifications, and year of graduation. The qualitative component consists of comments on the questionnaires that were transcribed and analyzed to determine into which category they should be reported.

Discussion of the Highlights and Implications of the Study

The professional role of a dental hygienist includes five primary responsibilities, as defined in the document Dental Hygiene: Definition and Scope (1994). The first of these responsibilities is clinical therapy: primary interceptive, therapeutic and maintenance procedures. The competencies in this category which were rated high to very high importance were in keeping with the original skills and knowledge that Dr. Fones initiated in his dental hygiene programs in 1913, and that became the accepted dental hygiene curriculum by 1961: sterilization, providing examinations, x-ray service, scaling and polishing teeth, polishing fillings, and providing topical fluoride service. Fones was also an advocate of client education and the maintenance of health. This emphasis on treatment planning and education in the dental hygiene diploma program is still evident in the high rating of importance for the corresponding clinical therapy competencies.

As the profession of dental hygiene progressed, procedures which were performed by other oral health professionals became included in the dental hygienists' education programs. Analysis of the clinical therapy competencies indicates that procedures that could be performed by a certified dental assistant (e.g. panoramic radiographs/mean = 3.88; take dental photographs/mean = 3.10; fabricate study casts/mean = 3.06),or by a dentist (e.g. determining vital signs/mean = 3.48; monitoring the client for adverse reactions/mean = 3.78; comprehensive charting/mean = 3.57; testing pulp vitality/mean = 2.78) received more moderate ratings of importance. However, the competencies in the Pain Management subcategory concerning the application of topical and local anesthetic rated high (mean = 4.17 and 4.01 respectively), even though they were originally the dentist's responsibility. The British Columbia and Saskatchewan dental hygienist's noted the benefits of being able to administer local anesthetics: the ability to provide continuous treatment and time efficiency. Alberta respondents recognized the benefits and commented overwhelmingly that this procedure should be allowed in their province. Therefore, the first step for Alberta should be to include local anesthesia in their diploma program.

When comments were made that a clinical therapy competency was not performed in the respondent's practice (no oral irrigation; no safety glasses for clients; and the limited availability of the electronic anesthetic), then the competency had a moderate rating of importance. Another competency with a moderate rating of importance that is not practiced very frequently by dental hygienists is the Specialty Procedure concerning oral diagnostic tests (mean = 3.67). New technology in the areas of bacterial identification and oral cancer detection requires testing and marketing before it will be considered for higher importance to a graduating dental hygienist. However, unfamiliarity on the part of the respondents is not a sufficient reason for excluding new practices that are advocated by researchers.

The lowest rating in the subcategory on Pain Management was the administration of nitrous oxide sedation (mean = 2.37); because of the risk factors, this procedure was considered to be the dentist's or doctor's responsibility. The background preparation seems to be beyond the scope of a diploma dental hygiene program.

There were two subcategories which involved competencies which were the responsibility of specialists: periodontists and orthodontists. The competencies in the Periodontal Procedures subcategory had a moderate rating of importance (overall mean = 3.361). The dental hygienists commented that they did not have an opportunity to place and remove periodontal dressings. Even though there were no comments concerning the removal of sutures, the rating was moderate which may indicate that the dentist is performing this procedure. Therefore, this skill would not be part of the dental hygiene diploma program but would be taught in the periodontist's practice. Basic knowledge about suture removal is required, but the general practice dental hygienist may not have the exposure necessary to become competent.

Comments relating to gingival curettage indicated that the importance of this procedure is under question and if done at all it should be the periodontist's responsibility. Therefore, this outdated procedure should be excluded from dental hygiene programs.

Orthodontic procedures were rated low in importance (mean = 2.447) and the consensus was that these competencies should be in a separate module that is offered to graduate dental hygienists when they are employed by an orthodontist: separate certification beyond the preparatory level in continuing education courses is the route that dental hygienists are now using. The competency concerning the removal of excess cement following cementation of orthodontics was rated of moderate importance (mean = 3.20) because dental hygienists do encounter clients who need this procedure. Once again, basic understanding of the orthodontic process allows a graduate dental hygienist to competently remove excess cement and dental hygiene diploma programs should provide for this level of competence.

The competencies in the Restorative Procedures subcategory which related to the placement of temporary, plastic or amalgam restorations were rated low in importance (mean = 2.83, 2.26, and 2.16 respectively) and were considered the responsibility of the dentist and beyond the scope of a dental hygiene program. Saskatchewan respondents rated the competencies in this subcategory higher than respondents from Alberta and British Columbia because Saskatchewan has a history of allowing dental therapists to perform restorative procedures, and there are dental therapists who are now practicing dental hygienists. Therefore, it is not surprising that the dental hygiene population in Saskatchewan would rate restorative procedures higher in importance than their Western neighbors. However, only dental hygienists with additional certification may perform restorative procedures and, therefore, these competencies should not be required in the dental hygiene diploma programs.

The second responsibility of dental hygienists, according to the Canadian Dental Hygienists' Association, is health promotion: the processes of enabling individuals and communities to increase control over and improve their health. Health promotion involves providing people with equal opportunities to access resources and to achieve their fullest health potential. Respondents rated high importance to understanding the needs and special requirements of their clients (mean = 4.27 - 4.29). There was a high rating of importance found with respect to consultation and collaboration with clients, care givers and other health professionals in order to influence the quality of the client's service (mean =

4.17). However, only respondents who worked in community health settings commented favorably for the management of community oral health education programs (mean = 3.80). The moderate rating of importance could be due to the limitations of a two year program. Therefore, competence in the area of health promotion may not be attainable in a diploma program. Suggestions were that issues concerning the greater community should be included in a bachelor degree program. These courses could be options depending on the specialty that the student in the bachelor of dental hygiene program deemed important to their career.

The third responsibility of graduating dental hygienists is education: this category refers to teaching and learning. Psychology has been included in the dental hygiene programs from the beginning to familiarize dental hygienists with motivational skills and behavior modification techniques (Quinn & Black, 1961). Through communication and collaboration with the client the dental hygienist develops the treatment plan, determines the strategies and resources required to successfully complete the plan, and evaluates the outcomes. Courses in psychology, sociology, and communication may need to be in a prerequisite year as is already the practice in numerous universities and colleges in Canada and the United States. There are educators who suggest that there may be a need to increase the length of dental hygiene programs in order to accommodate an increase in the determination of the overall oral health status of the patient (Abraham & Kostiv-Cirincione, 1990: Paarmann, Herzog, & Christie, 1990). A basic two-year diploma program cannot prepare a student to be an effective educator.

Respondents agreed with educators of dental hygiene programs (Kraemer & Gurenlian, 1989) and rated the education competencies high to very high importance (overall mean = 4.569). While comments suggested that specialty information should be delivered by the specialist, it is important to remember Dickoff's (1988) comment that dental hygienists are in the unique position of educating the patients without intimidating them. Therefore, knowledge of the principles should be rated very important. Comments were made concerning the responsibility of education: the respondents were not always comfortable with making decisions independent of the dentist. However, the respondents considered the educational responsibility of dental hygienists to be of paramount importance in dental hygiene diploma programs.

The fourth responsibility is administration: policy development and management processes that may occur in any dental hygiene practice setting. The literature expounds the values of participation in the development of the office policies in order to affect the direction of the organization/practice (Brand, 1994; Kee & Darby, 1986). This ensures that the dental hygienist practices legally, ethically and professionally. The dental hygienists did rate participating in decision making as very high in importance (mean = 4.58). However, the competencies that refer to the development of a business profile (mean = 3.66) and the participation in the hiring of personnel (mean = 3.26) were only rated of moderate importance. While the dental hygienists value participation, they are more cautious about competencies that move towards independent practice. The two-year dental hygiene diploma programs seem to emphasize the technical and motivational skills, but they leave the administrative responsibilities up to their employer. In the United States, in Colorado, where independent practice is legal, (California Health Manpower Pilot Project, 1993), the practitioner is encouraged to take additional courses beyond their bachelor degree in dental hygiene to provide the skills for business and administration.

The respondents rated competencies that require the responsibility of performing periodic documentation audits moderately important. (mean = 3.24.) Perhaps the literature is correct in assuming that revisions towards a bachelor degree in dental hygiene are necessary if dental hygienists are to be prepared for additional responsibilities.

Another issue that was considered to be imperative is that dental hygienists be taught to communicate the information that they collect from their clients to the appropriate dental or allied health professionals (mean = 4.48). This includes the management of special needs clients. Respondents rated communication and consultation high in importance. Respondents also recognized the benefits and liabilities of being a professional and rated the prevention of malpractice as high importance (mean = 4.28). As a graduate of a dental hygiene diploma program, the dental hygienist will have to be competent in their legal and ethical responsibilities to their clients.

A good recall system in an educational program is considered important in the literature because it allows dental hygienists to monitor changes in their clients' attitudes, knowledge and skills (Campbell, Shuman & Bauman, 1993). Despite the emphasis on recall systems by the accreditation team, this competency only rated at the upper end of moderate importance (mean = 3.93). This responsibility may be given to the receptionist or office management that could account for the decreased importance. There does not seem to be any emphasize on this competency in a diploma program because the school's administration takes on this huge recall responsibility and the students merely tap into an already existing client pool.

The fifth responsibility is research which involves studying and reporting informal and formal scientific investigation in order to supplement, revise and validate dental hygiene practice. The purpose of research is to disseminate new information to the profession and to other fields of science (Phillips, 1959). An openness to new information and an ability to critically evaluate research findings are considered to be desired end points. Dental hygienists must remain current and capable of understanding the implications of the new discoveries in their profession and in associated health professions (Brunnet, 1992).

Respondents did rate the research competencies that related to continuing education and to the understanding of professional/scientific literature of high importance (mean = 4.45). These competencies are required of diploma students. However, respondents had moderate ratings of importance concerning their personal contribution to that body of research (mean = 3.19-3.55). This seemed beyond the diploma program and was deemed the responsibility of a bachelor or masters program.

The dental hygienists who worked in community health commented on their bias towards research in their settings. However, dental hygienists in private practice did not believe that research was generally required in their setting. Again the suggestion from respondents was that research would be highly important in a bachelor degree dental hygiene program. While the respondents from the `Bachelor Degree' category rated one research competency greater than the `Diploma Only' category, the `Diploma & Other Courses/Certificates' rated four of the research competencies higher than the respondents from the `Diploma Only' category. This could indicate that what really matters is that dental hygienists continue to learn and be open to new information, and that the dental hygienists with additional education recognize the importance of incorporating research into their list of competencies.

Demographic Implications

Numerous factors influence dental hygienists' expectations of dental hygiene programs: provincial jurisdiction, year of graduation, practice setting, and educational qualifications. This section of the study examines the implications of these factors and concludes with a recognition of the limitations of a diploma and the possibilities for a bachelor degree.

Saskatchewan respondents were higher in their rating of importance of the competencies. Closer examination reveals that the majority of respondents in this group have courses or certificates beyond their dental hygiene diploma (79.4%). Most of the dental hygienists were previously dental therapists and are legally allowed to practice restorative procedures in Saskatchewan (Health and Welfare Canada, 1988). It appears that the more exposure the dental hygienists had to procedures, the more importance they awarded to that skill. Experience in a competency could have influenced the respondents choices so that they have an inflated expectation of dental hygiene diploma programs.

Both Saskatchewan and British Columbia are licensed to administer local anesthetic, and the respondents in both provinces rated this competency higher than Alberta respondents. British Columbia and Saskatchewan also had higher ratings of importance for the competencies pertaining to the maintenance of access to colleagues and other resources, and the participation in decision making in the practice environment (see Table 6). This openness to participation may be influenced by the type of supervision that the respondents in these two provinces have encountered. British Columbian dental hygienists have experienced less direct supervision: "In British Columbia, dental hygienists have worked for decades under the direction of dentists, as opposed to direct or indirect supervision, without any deleterious effects to the patients treated" (Health and Welfare Canada, p. 74).

The Saskatchewan respondents have either been dental therapists prior to their dental hygiene education or they were educators working in post-secondary institutions. In both cases, they have been practicing without direct supervision. This experience of reduced supervision has influenced the dental hygienists rating of importance of participating in decision making processes. The regulations regarding reduced supervision in Saskatchewan and British Columbia must be reflected in the curriculum: education programs in adjacent provinces will have to examine their regulations and curricula to accommodate students who will study in their programs and then return to their home provinces.

The year of graduation affected the respondents rating of importance of infection control practice. The more recent graduates rated the importance of infection control practices higher than the respondents who graduated before these competencies were emphasized (see Table 7). The increased emphasis on infection control has resulted in new guidelines to which all graduates must adhere. This is a continuing education issue for older graduates who must remain current and practice at the level of the new graduates and the existing students whose education reflects accepted infection control standards.

Respondents in the `Community Health' settings had a lower rating of importance for the competency referring to the wearing of rubber/latex gloves, safety glasses and a face mask than all the other practice settings (see Table 8). Again, these respondents would spend less of their time in a clinical setting and would therefore not rate this competency as high. However, in a preparatory program, the standards are based on research and all hygienists must know the accepted infection control protocol, regardless of their practice setting.

The more experience that a dental hygienist receives in a particular competency, the higher the rating of importance. The respondents who graduated from 1964-1983 had higher ratings of importance for the application of chemotherapeutics (mean = 4.8125 in comparison with 4.2407 for 1984-1993). The respondents in the 1974-1983 category rated the application of the knowledge of bleaching techniques, the use of anticariogenic agents, the monitoring of the client for adverse reactions, the development of a community profile, and the participation in the hiring of personnel, higher than the graduates from 1984-1993. These competencies may require the experience attained in a practice setting before a dental hygienist feels that she/he will attain competency in these skills. However, the graduating dental hygienist should have an understanding of the principles involved in these procedures and possess the skills to access that information when she/he requires it.

An analysis of the practice settings demonstrated that the respondents who were employed in Post-Secondary institutions rated competencies higher than the respondents in other practice settings (see Table 8). These are the educators of the dental hygiene programs and they are aware of the overall scope of practice that a graduating dental hygienist may be expected to perform. Post-secondary educators must remain current and are therefore networking with other educators and researchers. They recognize the need to prepare graduates for an expanded list of responsibilities. It is a challenge for educators to provide the most recent research and accepted practice and they see the need to include new technologies such as electronic anesthesia, cephalometric radiographs, dental photographs and new anticariogenic agents in their curricula.

Educators must sensitize their students to the need for addressing target populations and for designing community health promotion strategies. It is an educator's obligation to promote research and to be role models for that competency (Keller, Seydel, Kremenak & Kremenak, 1993). This requires the knowledge of sociodemographics, health care delivery and education techniques. Dental hygienists do not work in isolation. There is a cross-over into other professions and they need to make an impact and have their research recognized. The diploma can provide the foundation for research and critical thinking but additional education is required to analyze and develop strategies and operational plans for educational institutions, hospitals, and other administrative settings.

Respondents who work in community health settings recognized the need to prepare students for the research skills that dental hygienists in their setting must possess. Dental hygienists in community health must collaborate with other dental and allied health professionals that require communication skills. Dental hygienists are professionals and they must be taught collaboration within their education programs. Consolidated clinics with dental students, dental hygiene students, and other health care professionals prepare all parties for continuation of these practices after they graduate. Each profession must recognize their roles in conjunction with others. Expansion of awareness is necessary in order to develop mutual expectations (Kee, A. & Darby, M. 1986).

Since dental hygienists are a prime entry point into oral health care their collaboration with other health care professionals is also beneficial to the public. Clients in the dental setting can be referred to other medical professionals. As well, other health care professionals may refer their clients to dental hygienists. If dental hygienists are going to provide specialize oral health care, then dental hygiene schools have a responsibility to make it clear which competencies a dental hygienist must develop in their education program in order to provide their clients with the specialized treatment.

Dental hygiene schools in the United States (Colorado), require two years of university education prior to entry into their program (University of Colorado, 1995). They attain the common base of knowledge that is required of other health care professionals in prerequisite courses: English, Biochemistry, Psychology, Public Speaking, and Sociology. Competency in administration, management, and research requires knowledge in computing, economics, research techniques, and writing methods. Other health care professionals have these additional competencies. In order for dental hygienists to have parity with occupational therapists, speech pathologists, nurses, social workers, etc., they need the basic knowledge level that a bachelor degree provides. Therefore, dental hygienists who wish to expand into management, budgeting and marketing must go beyond the diploma level of dental hygiene. Competence in administrative roles requires managerial skills such as planning, organizing, directing and coordinating resources that could be provided in a bachelor degree.

In addition to giving referrals to other health care professionals, dental hygienists may have an opportunity to co-publish with other professionals. This will require a mutual understanding of the education backgrounds of the potential research partners. In order to remain credible and accredited, the dental hygiene schools must participate in research. Collaboration with other disciplines increases the visibility and viability of the dental hygiene school. The students will learn how to collaborate with others to affect change in policies, standards and legislation; this is their professional responsibility.

In conclusion, if the purpose of education standards is to provide educators with a guide for curriculum design and the profession, the clients, the courts and other health professionals with a definition of dental hygienists' responsibilities, then it must be clear which dental hygiene programs are being defined. Different practice levels should be defined to accommodate the different levels of education: two-year diploma programs; additional certificates for procedures such as administration of local anesthetics, placement of restorations, and performance of orthodontic services; and bachelor degree programs. It is the responsibility of the dental hygiene profession to determine the need for providing different levels of education and corresponding education standards.

One Alberta respondent, who works in a periodontal specialty practice, passionately stated her/his overall concern with limiting our scope of practice:

> This entire area (orthodontics) is wonderful to have access to. However, before having an ortho module, dental hygienists require a pharmacotherapeutic and bacteriological/pathogen assessment module to effectively treat our patients. As it stands, without being able to administer local anesthetic, to screen for known pathogenic bacteria, to perform soft tissue curettage, and to prescribe antibiotics both prophylactically as well as post treatment or during treatment as required - we will remain as mere technicians offering limited services to our clients and will require the practice limiting restrictions of having to depend on the `Dentist' to provide these technical (local anesthetic) as well as knowledge based (bacteriologic testing data results, use of pharmacotherapeutics & soft tissue curettage) considerations. As it stands today, with the oversupply of dental hygienists, there will be a push by the dentists to expand the duties of auxiliaries other than D.H.'s such as Dental Assts. & Uncertified Chairside Assts. to take over these duties and supplement the D.H. in private practice.

As professionals, it is imperative that dental hygienists continue to examine what services they are providing for their clients and for the community. They must remain current and aware of new technologies that should be incorporated into their curriculum and be prepared to expand into higher levels of education.

Recommendations for Dental Hygiene Programs

The results from the study prompt the following recommendations for dental hygiene programs.

1. Courses in biology, chemistry, psychology, sociology, English, and communication should be in a prerequisite year as is already the practice at numerous universities and colleges in Canada and the United States.
2. Dental hygiene programs should continue to provide preparation in the competencies that have been fundamental dental hygiene treatments: instrumentation; coronal polishing; application of fluoride, chemotherapeutic agents, anticariogenic agents, and desensitizers; oral irrigation; proper care of implants and prosthesis; and placement of pit and fissure sealants.
3. Dental hygienists are professionals and they must be taught to collaborate with other dental and allied health professionals within their education programs. Each profession must recognize their roles in conjunction with others.

4. Dental hygiene program developers must examine the regulations and curricula of other provinces to prepare students who will study in their programs and practice in another province.

5. Dental hygiene diploma programs must teach the students how to administer local anesthesia.

6. Dental hygiene programs must prepare the students to maintain a safe and effective environment for the client and the dental team. There must be strict adherence to infection control practices.

7. It is a challenge for educators to provide the most current research and accepted practice and to introduce new technologies such as electronic anesthesia, cephalometric radiographs, dental photographs and new anticariogenic agents in their dental hygiene programs. Outdated procedures such as gingival curettage should be excluded from dental hygiene programs.

8. Basic knowledge about suture removal is required, but the general practice dental hygienist may not have the exposure necessary to become competent.

9. Orthodontic procedures were rated low and the consensus was that these competencies should be in a separate module that is offered to graduate dental hygienists when they are employed by an orthodontist: separate certification beyond the preparatory level in continuing education courses is the route that dental hygienists are now using.

10. Only dental hygienists with additional certification may perform restorative procedures and, therefore, these competencies should not be required in the dental hygiene diploma programs.

11. Competence in the area of health promotion may not be attainable in a diploma program. Therefore, issues concerning the greater community should be included in a bachelor degree program. These courses could be options depending on the specialty that the student in the bachelor of dental hygiene program deemed important to their career.

12. While dental hygiene students must remain current and capable of understanding the implications of the new discoveries in their profession and in associated health professions, extended studies in research should be provided in a graduate program.

13. The diploma can lay the foundation for research and critical thinking but additional education is required to analyze and develop strategies and operational plans for educational institutions, hospitals, and other administrative settings.

14. Dental hygienists who are interested in administrative roles require managerial skills such as planning, organizing, directing and coordinating resources which should be provided in a bachelor degree.

15. Additional courses beyond the bachelor degree in dental hygiene are required to provide the skills for business and administration which would be required in independent practice.

Recommendations for Further Research

Recommendations for further research are presented below.

1. Since the accreditation process will become the responsibility of the Canadian Dental Hygiene Association in the future, it is essential to compare the curricula from all Canadian Dental Hygiene schools in order to establish a national standard which will allow the institutions to improve the effectiveness of their education programs.

2. The National Certification Examination for Canadian dental hygienists should be reviewed to determine if the weighting of importance of specific knowledge, skills and attitudes properly reflects the responsibilities of dental hygiene graduates, according to their education level.

3. Further research is required in the area of consumer needs and their perceptions of the dental hygienist's responsibilities. The public may need to recognize the under utilization of dental hygienists' skills and knowledge before they can become advocates for the expansion of responsibilities and the improvement of access to care and information.

4. Additional surveys should extend to other health care professionals and legal professionals to determine their expectations of dental hygienists and the collaborative role they see dental hygienists playing in the future.

5. A cost-effectiveness analysis of dental hygiene practices would demonstrate the relationship between the amount of time spent on each procedure and the revenue that the procedure generates for the dental practice.

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APPENDICES

APPENDIX A - COVER LETTER

1042 Parker Drive
Sherwood Park , Alberta
T8A 1C6
(403) 467-6471

May 15, 1995

Dear Colleague:

I am employed at the University of Alberta in the Faculty of Dentistry, Division of Dental Hygiene, as an assistant professor. For the last two years I have also been a graduate student in the Master of Education program at the University of Alberta. I am currently completing my thesis, which is entitled Competencies of Canadian Dental Hygienists.

My research includes a survey which will be distributed to 240 dental hygienists from Western Canada on May 15, 1995. The names were selected randomly from the listings of all registered dental hygienists with the Canadian Dental Hygienists' Association. The participation is voluntary and the recipients of the surveys may withdraw at any time. All responses will remain completely anonymous and only group data will be reported.

The survey identifies the competencies required for a graduating dental hygienist to be qualified to provide oral care. The questionnaire was developed by examining the following sources: the Health and Welfare document, The Practice of Dental Hygiene in Canada (1988); the Education Standards Workshop Report (1994); the Provincial Review of National Dental Hygiene Examination Competencies (1995); and the University of Alberta's Dental Hygiene Curriculum Guide (1994).

Communication was maintained with the education practice standards' project researchers to ensure that this study would supplement their research. The CDHA has the right to publish the research generated by this study. The outcomes of this study will contribute to initiatives in curriculum development, accreditation, national certification and quality assurance. Standardized documentation of dental hygienists' roles will also provide other health care professionals and legal professionals with an understanding of the dental hygiene profession.

The success of the study depends on the response of the dental hygienists who receive the survey. I would greatly appreciate your support by completing the questionnaire and returning it in the enclosed addressed, stamped envelope before **June 5, 1995**.

I appreciate your cooperation in supporting this study. If you have any questions about the questionnaire or the study, please call me collect. Please accept an advance "thank you" for your consideration of my request for your assistance. I look forward to receiving your questionnaire.

Sincerely yours,

Louanne Keenan, Dip DH, BA

APPENDIX B - REMINDER LETTER

May 29, 1995

Dear Colleague:

If you have completed and returned the dental hygiene education standards questionnaire, a sincere THANK YOU!

If you have not yet completed the questionnaire, please do so as soon as possible and return it in the envelope provided.

Sincerely yours,

APPENDIX C - REQUEST FOR SUPPORT FROM PROVINCIAL ASSOCIATIONS

1042 Parker Drive
Sherwood Park , Alberta
T8A 1C6
(403) 467-6471

May 10, 1995

Dear Madame:

I am employed at the University of Alberta in the Faculty of Dentistry, Division of Dental Hygiene, and in private practice. For the last two years I have also been a graduate student in the Master of Education program at the University of Alberta. I am currently completing my thesis, which is entitled Competencies of Canadian Dental Hygienists.

My research includes a survey which will be distributed to 240 dental hygienists from Western Canada on May 15, 1995. The names were selected randomly from the listings of all registered dental hygienists with the Canadian Dental Hygienists' Association. The participation is voluntary and the recipients of the surveys may withdraw at any time. All responses will remain completely anonymous and only group data will be reported.

The survey identifies the competencies required for a graduating dental hygienist to be qualified to provide dental care. The questionnaire was developed by examining the following sources: the Health and Welfare document, The Practice of Dental Hygiene in Canada (1988); the Education Standards Workshop Report (1994); the Provincial Review of National Dental Hygiene Examination Competencies (1995); and the University of Alberta's Dental Hygiene Curriculum Guide (1994).

The outcomes of this study will contribute to initiatives in curriculum development, accreditation, national certification and quality assurance. Standardized documentation of dental hygienists' roles will also provide other health care professionals and legal professionals with an understanding of the dental hygiene profession.

The success of the study depends on the response of the dental hygienists who receive the survey. The Alberta Dental Hygienists' Association has agreed to support this survey in the Alberta Probe; I would greatly appreciate your support through a notification in your newsletter that the dental hygienists in your province may be selected for this important study. Communication was maintained with the education practice standards' project researchers to ensure that this study would supplement their research. The CDHA has the right to publish the research generated by this study.

I appreciate your cooperation in supporting this study. If you have any questions about the questionnaire or the study, please call me collect. Please accept an advance "thank you" for your consideration of my request for your assistance. I look forward to hearing from you.

Sincerely yours,

Louanne Keenan

APPENDIX D - QUESTIONNAIRE INSTRUMENT

SURVEY TO ASSESS COMPETENCIES OF GRADUATE DENTAL HYGIENISTS

SURVEY TO ASSESS COMPETENCIES OF GRADUATE DENTAL HYGIENISTS

SECTION I: PROFESSIONAL PROFILE

1. What is your basic education in dental hygiene? (check only one box)

☐ Diploma/Certificate

☐ Associate degree

☐ Bachelor's degree

☐ Other (specify) ____________________

2. In what year did you graduate as a dental hygienist? __________

3. What additional formal education have you completed? (check only one box)

☐ None

☐ Courses taken toward a certificate or degree

☐ Certificate

☐ Bachelor's degree

☐ Master's degree

☐ Other (specify) ____________________

4. **Which of the following best describes your current or most recent principal employment setting? (check only one box)**

☐ Solo general dental practice

☐ Solo specialty dental practice
(specify specialty) ______________________

☐ Group general dental practice

☐ Group specialty dental practice
(specify specialty) ______________________

☐ Both general and specialty dental practice
(specify specialty) ______________________

☐ Public health agency

☐ Post-secondary educational institution

☐ Other (e.g. half time in two settings - specify settings) ______________________

5. **Have you practiced as a dental hygienist at least fifty (50) days over the last three years?**

☐ Yes (Please proceed to Section II).

☐ No (Please stop here and return the questionnaire in the envelope provided. Thank you.)

PREAMBLE TO SECTION II:

Section II of the questionnaire asks you to evaluate the competencies for graduate dental hygienists, which the researcher has developed by consulting the following sources: individuals involved in developing the Education Standards Workshop Report (1994); the Provincial Review of National Dental Hygiene Examination Competencies (1995) for CDHA/ACFD; the University of Alberta dental hygiene curriculum; and Health and Welfare's document, The Practice of Dental Hygiene in Canada (1988).

The items are organized under the five primary responsibilities of a dental hygienist: Clinical Therapy, Health Promotion, Education, Administration and Research.

Each item that follows a section describes a competency required by the graduating dental hygienist in order to provide adequate oral health care for their clients.

When assessing each item, consider dental hygiene practice in general (in all practice settings). If you have comments about an item as it relates to your professional responsibilities, make those remarks in the "Comments" spaces following each section. If you think other items that should be included, also write them in the "Comments" spaces.

SECTION II:

You are asked to indicate the level of importance of EACH item required for graduate dental hygienists (in all practice settings) to be able to provide adequate oral hygiene care. For example, if one of the items was, "wears a cap", you might choose the VL column indicating that you judge wearing a cap to be of very low importance for graduate dental hygienists to be able to provide adequate oral hygiene care.

	EXAMPLE	**VL**	**L**	**M**	**H**	**VH**
1.00	Wears a cap.	●	○	○	○	○

Fill in the circle in the column corresponding to the statement which best describes your judgment of the level of importance of each item for graduate dental hygienists to be able to provide adequate oral hygiene care. Fill in only one circle for each statement. Your own view is important. Please answer without consulting your colleagues.

VL	**L**	**M**	**H**	**VH**
VERY LOW	LOW	MODERATE	HIGH	VERY HIGH

Please indicate your judgment of the level of importance of a graduating dental hygienist being able to perform the following competencies.

Level of Importance

		VL	**L**	**M**	**H**	**VH**
	CLINICAL THERAPY : Refers to primary interceptive, therapeutic and maintenance procedures which enable the client to achieve optimal oral health and contribute to overall health.					
1.01C	Record clinical data, clinical and educational processes and outcomes, accurately and permanently.	○	○	○	○	○
1.02C	Obtain personal information (e.g. cultural and socioeconomic factors).	○	○	○	○	○
1.03C	Obtain medical history.	○	○	○	○	○
1.04C	Determine, record and monitor vital signs.	○	○	○	○	○
1.05C	Records the necessity for special precautions (contra-indications for treatment).	○	○	○	○	○
1.06C	Examine head, neck, and intraoral soft tissues, identifying concerns.	○	○	○	○	○

COMMENTS on the above items?
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Please indicate your judgment of the level of importance of a graduating dental hygienist being able to perform the following competencies.

Level of Importance

		VL	**L**	**M**	**H**	**VH**
1.07C	Examine periodontium.	○	○	○	○	○
1.08C	Perform periodontal charting.	○	○	○	○	○
1.09C	Perform a visual examination of the dentition.	○	○	○	○	○
1.10C	Perform comprehensive caries and restorative charting.	○	○	○	○	○
1.11C	Test pulp vitality.	○	○	○	○	○
1.12C	Examine occlusion.	○	○	○	○	○
1.13C	Assess hard and soft deposit.	○	○	○	○	○
1.14C	Assess client's oral self-care using indices and other assessment methods.	○	○	○	○	○
1.15C	Assess lifestyles related to general and oral health (e.g. smoking).	○	○	○	○	○
1.16C	Assess risk factors/markers for caries, periodontal disease, and other pathologies.	○	○	○	○	○
1.17C	Expose, process and mount intra-oral radiographs .	○	○	○	○	○
1.18C	Expose, process and mount panoramic radiographs.	○	○	○	○	○
1.19C	Expose, process and mount cephalometric radiographs.	○	○	○	○	○
1.20C	Interpret dental radiographs.	○	○	○	○	○
1.21C	Fabricate study casts (take and pour impressions).	○	○	○	○	○
1.22C	Fabricate mouth protectors.	○	○	○	○	○
1.23C	Take dental photographs.	○	○	○	○	○
1.24C	Take oral diagnostic tests (e.g. bacterial content within sulcus; salivary pH; oral cancer detection).	○	○	○	○	○
1.25C	Ensures client and personal safety by practicing accident and injury prevention.	○	○	○	○	○
1.26C	Recognize signs and symptoms of medical emergencies in the dental office.	○	○	○	○	○
1.27C	Practice principles of infection control.	○	○	○	○	○
1.28C	Wear rubber/latex gloves, safety glasses and a face mask.	○	○	○	○	○

COMMENTS on the above items?

Please indicate your judgment of the level of importance of a graduating dental hygienist being able to perform the following competencies.

Level of Importance

		VL	L	M	H	VH
1.29C	Protect the client's eyes with safety glasses.	○	○	○	○	○
1.30C	Understand the impact of pharmacological actions/interactions and oral manifestations of medications.	○	○	○	○	○
1.31C	Provide emergency care (e.g. activate 911).	○	○	○	○	○
1.32C	Maintain current certification in cardio-pulmonary resuscitation and basic first aid.	○	○	○	○	○
1.33C	Use scientifically recognized clinical techniques in performing procedures.	○	○	○	○	○
1.34C	Select suitable equipment and resources for the services being provided.	○	○	○	○	○
1.35C	Manage client's anxiety/discomfort during the provision of clinical services.	○	○	○	○	○
1.36C	Administer local anesthetic.	○	○	○	○	○
1.37C	Administer nitrous oxide and oxygen conscious sedation.	○	○	○	○	○
1.38C	Practice appropriate adaptation of instruments.	○	○	○	○	○
1.39C	Maintain instruments so that they are sharp and have an appropriate shape.	○	○	○	○	○
1.40C	Assemble and transfer instruments during assisting procedures.	○	○	○	○	○
1.41C	Maintain and isolate operating field to reduce cross-contamination.	○	○	○	○	○
1.42C	Maintain operatory, equipment and instruments, according to manufacturers specifications.	○	○	○	○	○
1.43C	Perform mechanical debridement by hand instrumentation.	○	○	○	○	○
1.44C	Perform mechanical debridement by sonic/ultrasonic instrumentation.	○	○	○	○	○
1.45C	Perform appropriate polishing techniques.	○	○	○	○	○
1.46C	Apply appropriate chemotherapeutic agents.	○	○	○	○	○
1.47C	Perform oral irrigation.	○	○	○	○	○
1.48C	Apply knowledge of bleaching techniques.	○	○	○	○	○
1.49C	Desensitize teeth.	○	○	○	○	○
1.50C	Assess the need for systemic fluoride.	○	○	○	○	○

COMMENTS on the above items?

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Please indicate your judgment of the level of importance of a graduating dental hygienist being able to perform the following competencies.

		Level of Importance				
		VL	**L**	**M**	**H**	**VH**
1.51C	Assess the need for and provide topical fluoride.	○	○	○	○	○
1.52C	Apply topical anesthetic.	○	○	○	○	○
1.53C	Perform electronic anesthesia.	○	○	○	○	○
1.54C	Recontour and finish restorations.	○	○	○	○	○
1.55C	Remove overhangs on restorations (margination).	○	○	○	○	○
1.56C	Place pit and fissure sealants.	○	○	○	○	○
1.57C	Use anticariogenic agents.	○	○	○	○	○
1.58C	Place and remove periodontal dressings.	○	○	○	○	○
1.59C	Perform gingival curettage.	○	○	○	○	○
1.60C	Remove sutures.	○	○	○	○	○
1.61C	Apply and remove rubber dam.	○	○	○	○	○
1.62C	Care for fixed and removable prosthesis.	○	○	○	○	○
1.63C	Implement appropriate care for dental implants.	○	○	○	○	○
1.64C	Assist in restorative procedures by applying and removing the matrix and wedge.	○	○	○	○	○
1.65C	Place temporary restorations.	○	○	○	○	○
1.66C	Place, carve, and finish plastic restorations.	○	○	○	○	○
1.67C	Place cavity liners and bases.	○	○	○	○	○
1.68C	Place amalgam restorations.	○	○	○	○	○
1.69C	Perform orthodontic services.	○	○	○	○	○
1.70C	Separate teeth prior to banding.	○	○	○	○	○
1.71C	Fit orthodontic bands prior to cementation.	○	○	○	○	○
1.72C	Cement orthodontic bands.	○	○	○	○	○
1.73C	Bond orthodontic brackets.	○	○	○	○	○

COMMENTS on the above items?

Please indicate your judgment of the level of importance of a graduating dental hygienist being able to perform the following competencies.

		Level of Importance				
		VL	**L**	**M**	**H**	**VH**
1.74C	Place and remove orthodontic arch wires.	○	○	○	○	○
1.75C	Remove orthodontic bands and brackets.	○	○	○	○	○
1.76C	Remove excess cement following cementation of orthodontic bands.	○	○	○	○	○
1.77C	Fit space maintainers.	○	○	○	○	○
1.78C	Prepare and record preliminary occlusal records.	○	○	○	○	○
1.79C	Classify occlusion and identify deviant swallowing patterns.	○	○	○	○	○
1.80C	Perform cephalometric tracings.	○	○	○	○	○
1.81C	Provide instruction in placement and care of removable orthodontic appliances.	○	○	○	○	○
1.82C	Monitor the client for adverse reactions to interventions.	○	○	○	○	○
1.83C	Develop the treatment plan in conjunction with the client or their caregiver.	○	○	○	○	○
1.84C	Record the treatment record (overall treatment plan, the treatment and counseling provided and the treatment progress).	○	○	○	○	○
1.85C	Assess the effectiveness of treatment plan and facilitate revisions based on the evaluation.	○	○	○	○	○
1.86C	Evaluate the need for further services for the client.	○	○	○	○	○
1.87C	Provide appropriate instructions for post-treatment.	○	○	○	○	○

HEALTH PROMOTION :
Refers to the process of enabling individuals and communities to increase control over and improve their health.

2.01H	Maintain access to colleagues and other resources who influence the quality of client services.	○	○	○	○	○
2.02H	Identify the needs of the elderly (social, medical, nutritional and pharmacological considerations).	○	○	○	○	○
2.03H	Initiate and participate in client consultation and collaboration with other health professionals and care givers.	○	○	○	○	○

COMMENTS on the above items?
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Please indicate your judgment of the level of importance of a graduating dental hygienist being able to perform the following competencies.

Level of Importance

		VL	L	M	H	VH
2.04H	Recognize the health needs of clients in under-serviced communities and the reasons for these needs.	○	○	○	○	○
2.05H	Develop a community profile.	○	○	○	○	○
2.06H	Understand the nutritional needs throughout the life cycle and special requirements for various oral conditions.	○	○	○	○	○
2.07H	Plan, conduct, and evaluate community oral health education programs.	○	○	○	○	○
2.08H	Understand the rationale for selected target population groups.	○	○	○	○	○
2.09H	Manage community oral health education program resources.	○	○	○	○	○

EDUCATION :
Refers to teaching/learning motivational and behavior modification processes which may occur in any dental hygiene practice setting.

3.01E	Assess the client's oral health needs.	○	○	○	○	○
3.02E	Use communication skills to encourage the client to participate during planning of oral health goals.	○	○	○	○	○
3.03E	Obtain informed consent.	○	○	○	○	○
3.04E	Discuss service priorities, options and alternatives with the client as determined following assessment.	○	○	○	○	○
3.05E	Assess barriers to the promotion of oral health (e.g. economics, attitudes, values, access).	○	○	○	○	○
3.06E	Develop a dental hygiene diagnosis and treatment plan based on priorities/goals determined in consultation with the client.	○	○	○	○	○
3.07E	Determine strategies to facilitate change that promotes health/oral health.	○	○	○	○	○
3.08E	Ensure that the client has access to educational resources and aids appropriate for his/her needs.	○	○	○	○	○
3.09E	Determine the methods for evaluating the outcomes/goals of services provided.	○	○	○	○	○
3.10E	Document the client's treatment plan.	○	○	○	○	○
3.11E	Discuss general principles, indications and procedures for periodontal surgery and maintenance therapy.	○	○	○	○	○

COMMENTS on the above items?

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Please indicate your judgment of the level of importance of a graduating dental hygienist being able to perform the following competencies.

Level of Importance

		VL	L	M	H	VH
3.12E	Discuss the different phases of a periodontal treatment plan.	○	○	○	○	○
3.13E	Educate clients regarding the relationship between diet and oral health.	○	○	○	○	○
3.14E	Verify that the client has received the planned care.	○	○	○	○	○
3.15E	Facilitate the interim evaluation of the service provided with the client.	○	○	○	○	○
3.16E	Evaluate the client's response to the service provided (biological, behavioral, and social/psychological reactions).	○	○	○	○	○
3.17E	Evaluate the need for further dental hygiene intervention.	○	○	○	○	○
	ADMINISTRATION : Refers to policy development and management processes which may occur in any dental hygiene practice setting.					
4.01 A	Develop office policies to ensure that the dental hygienist is able to practice legally, ethically and professionally.	○	○	○	○	○
4.02A	Consult with other members of the health care team in planning care/programs.	○	○	○	○	○
4.03A	Communicate the plan of care/programs to relevant health care team members.	○	○	○	○	○
4.04A	Participate in decision making in the practice environment.	○	○	○	○	○
4.05A	Participate in the hiring of personnel.	○	○	○	○	○
4.06A	Perform periodic documentation audits.	○	○	○	○	○
4.07A	Assess occupational hazards.	○	○	○	○	○
4.08A	Identify deficiencies in the practice environment and promote change to correct them.	○	○	○	○	○
4.09A	Compare and appreciate employment conditions and philosophies of public health, private practice, and specialty practice styles.	○	○	○	○	○
4.10A	Develop systems for management of client information.	○	○	○	○	○
4.11A	Manage a recall system.	○	○	○	○	○
4.12A	Practice in accordance with relevant legislation and regulations.	○	○	○	○	○

COMMENTS on the above items?

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Please indicate your judgment of the level of importance of a graduating dental hygienist being able to perform the following competencies.

Level of Importance

		VL	**L**	**M**	**H**	**VH**
4.13A	Outline the obligations of the contractual relationship with the employer.	○	○	○	○	○
4.14A	Practice in accordance with codes of ethics.	○	○	○	○	○
4.15A	Understand portability and the scope of dental hygiene practice across Canada.	○	○	○	○	○
4.16A	Describe the benefits and liabilities of being a professional.	○	○	○	○	○
4.17A	Discuss the significance of the practitioner/client relationship to the prevention of malpractice.	○	○	○	○	○
4.18A	Develop a business profile (fee assessment and payment information; self-employment).	○	○	○	○	○
4.19A	Ensure management of the special needs patient (understand specialty treatment in order to discuss options with the client).	○	○	○	○	○
4.20A	Document the outcomes of client services and share the information with the appropriate health care professionals and care-givers.	○	○	○	○	○
	RESEARCH: Refers to informal and formal scientific investigation, study and reporting which supplements, revises and validates dental hygiene practice.					
5.01R	Participate in activities and courses that contribute to the maintenance of professional competence.	○	○	○	○	○
5.02R	Discuss the techniques for conducting epidemiological surveys on oral health issues (gingival and periodontal disease, caries, oral cancer, tobacco use, etc.).	○	○	○	○	○
5.03R	Understand how professional/scientific literature should be evaluated.	○	○	○	○	○
5.04R	Integrate research into the practice environment.	○	○	○	○	○
5.05R	Develop/identify a research question/problem.	○	○	○	○	○
5.06R	Conduct screenings and compile statistics for epidemiological purposes.	○	○	○	○	○

THANK YOU FOR YOUR TIME AND THOUGHT IN EVALUATING THE COMPETENCIES.

PLEASE RETURN THE COMPLETED QUESTIONNAIRE IN THE ADDRESSED AND STAMPED ENVELOPE.

COMMENTS on the above items?

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